THE ENGINEERING AND MINING JOURNAL.

VOL. XIX.—No. 18. NEW YORK, SATURDAY, MAY 1, 1875. PRICE 10 CENTS PER COPY.

Coal Cutting Machinery.

CONTINUED FROM PAGE 285.

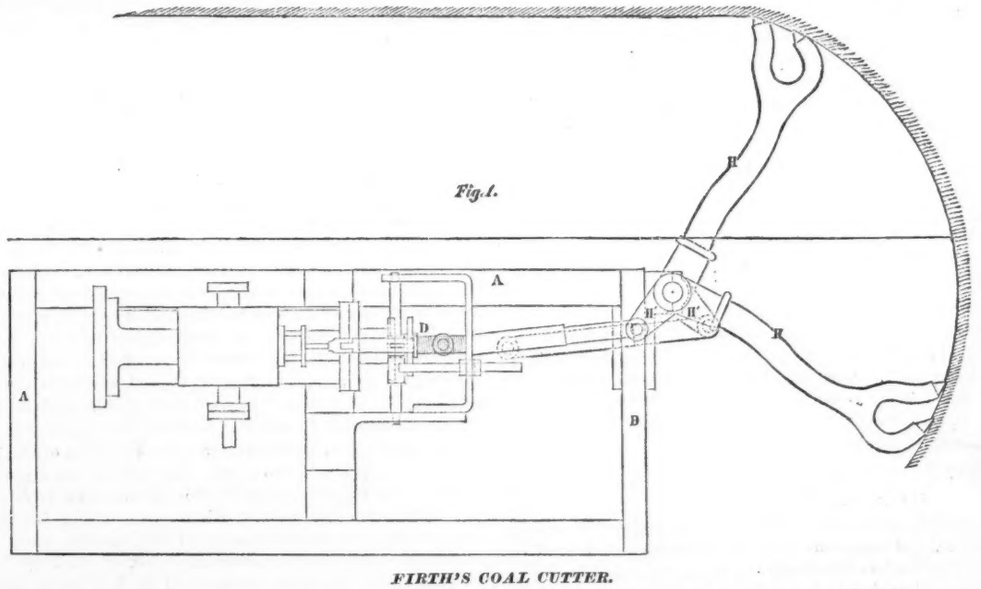
[The following notes are, for the most part, translated and condensed from a recent German monograph.]

Firth's Machine.—This was the first coal cutter that proved successful in practice, and is now quite largely used in England. The machine consists of a heavy pick, worked by means of a bell-crank lever.

In the Westardsley colliery, near Leeds, there are some eleven of these machines at work. Formerly the pick used was from 75 to 90 pounds weight, but a heavier tool has been found more servicable, and that used now weighs about 1½ cwt. and makes 70 to 80 strokes a minute. The weight of the whole machine is about 15 cwt. It is 4 feet long, 26 inches high, and runs on a track having a gauge from 18 to 24 inches; but it may be arranged for other widths.

The depth of the groove cut may be as much as 5 feet, being a greater depth than is attained by any other machine, and the rate at which it cuts may be taken from a trial of 24 hours steady work, in 1868, made with a light machine. The machine cut 257 yards and had to be moved from one chamber to another four times during the trial; this would give 12 square yards an hour, including stops. At a more recent trial we are told the machine cut a groove, 3 feet long and 3 feet deep, in from 4 to 5 minutes.

Fig. 1.



FIRTH'S COAL CUTTER.

The machine is moved forward automatically, or by means of a hand wheel, working the driving wheels through suitable gearing; in this manner the speed of the machine is regulated to the hardness of the material to be cut. The groove cut by this pick is about 2½ inches high, and the owners offer to cut cannel coal, anthracite, shale, or iron ore, to a depth of five feet. The pick, as now made, has two points, and at work it throws out about one-half the small coal it breaks; the balance has to be scraped out of the groove.

About 20 of these machines are in use; the men working them are paid from 3 to 4½ pence per running yard of cut, which is 3 feet deep, according to the nature of the coal worked. The vein consists of cannel coal and is about 2 feet thick.

In the Espie Mine, near Gartsherrie, mentioned in connection with the Gartsherrie Machine, the following rates are paid: The driver of the machine receives 7½ pence per ton of 20 cwt., cut and broken down; out of this he pays his two assistants, and retains himself 25/ per shift. The repairs and sharpening of knives is contracted for at 3 pence per ton of coal; the contractor takes care of 4 machines. In the Westardsley Colliery the average work of a machine is 50 to 60 yards, and it requires a man and two boys in attendance.

The price of all the coal cutters is about the same, namely, £250, (say $1,250). In most cases a yearly royalty of £50 is paid, or a given sum paid, once for all, for the right to use the machines.

Blast Furnace Economy.

REDUCTION OF CO_2 IN ANTHRACITE FURNACES.*

By HENRY M. HOWE, A.M., E. M.

CONTINUED FOM PAGE 293.

1. Mr. CHURCH gives the temperature of the gases as 260°, both in 1855 and in 1869-73. The conditions of working were so different in the two periods, as to make it very unlikely that the gases should escape at identically the same temperature during both.

2. He gives it, as if observed with no greater accuracy, and as if no more reliable, in 1873 than in 1855. A. I believe, (under correction,) that careful and repeated observations of the temperature of gases escaping from *close-topped* furnaces, with reliable and accurate pyrometers, were very rare in Pennsylvania in 1855. B. It strikes me as exceedingly improbable, that, as in Mr. CHURCH'S example of 1855, (p. 21, Vol. XVIII., 1874, ENGINEERING AND MINING JOURNAL,) the gases should escape as cool as 260° C, and yet, that all, or nearly all, of the CO_2 formed by reduction and impregnation, should be reduced as would be implied.

3. He does not tell us that the temperature of the gases was observed more accurately, or is more reliable, than the weight of blast, (which he gives us first as 20, and then afterwards as 8 tons); I have already pointed out that the weight of blast cannot be directly observed with anything like the accuracy necessary for an investigation of this kind.

TABLE OF DISTRIBUTION OF WASTE OF HEAT.

Theory.	BELL, all CO_2 from Ca CO_3 necessarily reduced.			No CO_2 from Ca CO_3 necessarily reduced.	
Waste gases assumed to escape at	I. Mr. CHURCH's assumption, 260° C.	II. 480°C.	III. Below 260° C, improbable.	IV. 480° C.	V. Mr. CHURCH's assumption, 260° C.
Causes of waste.	Calorics.	Calorics.	Calorics,	Calorics	Calorics.
Unnecessary reduction of CO_2	527	84	more than 527	830	1273
Unnecessary heat in gases	517	1166	less than 517	1166	517
Unnecessary gangue and C_a CO_3	1122	1121	1121	1121	1121
Total,	2165	2371		3117	2911

From this table we see that we cannot infer that more waste of heat is due to

* A paper read before the American Institute of Mining Engineers, at New Haven Conn., on Wednesday, February 24, 1875.

reduction of CO_2 than to the gases, if we accept BELL'S theory, unless, as in III., we suppose them to escape cooler than 260°, the temperature Mr. CHURCH himself assigns to them, which is not likely.

If we admit that it is possible that as much as 0.6 tons of CO_2 from $CaCO_3$ can effectively escape unreduced, which is extremely improbable, then, as we assign (IV.) a high, or (V.) a low, temperature to the gases we will find (IV.) more waste caused by the unnecessary escape of heat in the gases than by unnecessary reduction of CO_2, or (V.) the reverse.

But we will find that about as much slag is caused by the waste and $CaCO_3$ as by either of the other causes, whichever theory we accept, unless we assign an improbable temperature to the gases.

Finally, if the assumptions made in I., II., and III. [which make it highly improbable that unnecessary reduction of CO_2 causes more waste of heat than the gases do, or half as much as the slag and $CaCO_3$ do] err on either side, it is in the direction of showing too great a proportion of the waste to be due to reduction of CO_2. For the least possible reduction of CO_2 is assumed to be considerably less than has ever been reached in practice, while the lowest possible temperature of gases and weight of gases, slag and $CaCO_3$ assumed, have been reached, if not passed, in practice.

It must be observed that either an alteration of the heat requirement by only 8 per cent., or of the weight of blast by less than half a ton, is sufficient to entirely alter the deductions to be drawn from our data.

Now, while such inferences as Mr. CHURCH has drawn from these data may be interesting, I hold that it is unsafe to base advice as to practical construction upon them; and more especially, to advise that the furnaces should be run with hotter tops, a change which Mr. CHURCH confesses will increase the waste of heat in the gases, which cannot lessen that from the slag and $CaCO_3$, and which will be almost certain to increase that from reduction of CO_2, as I shall try to show in the second part of this paper.

Equally unsafe is it to state that they "leave but one answer, namely: The large amount of fuel used in anthracite furnaces is due to the EXCESSIVE REDUCTION OF CARBONIC ACID." [The capitals are Mr. CHURCH'S.]

§ 2.

Now, granting, for the sake of argument, that which I think we have no right to infer from the premises, that the principal waste of fuel is from the reduction of CO_2, let us consider the propriety of the remedy advised, which is to build anthracite furnaces with so much lower stacks and narrower throats that the exit gases may escape hotter, the upper part of the furnace be hotter and the entering charge be more quickly heated.

This is really the important part of what I would criticise: the physician's diagnosis is of little direct practical importance compared with his directions and treatment.

And, first, let us consider the conditions under which CO_2 is generated, and those under which it is reduced.

1. CO reduces iron oxide by the reactions

$$(3.)\ Fe_2O_3 + 3\,CO = 2\,Fe + 3\,CO_2,$$

and $$(4.)\ Fe\,O + CO = Fe + CO_2,$$

and deposits carbon by the reaction

$$(2.)\ 2\,CO = CO_2 + C,$$

both actions generating CO_2 at all temperatures above 200° C, at a rate increasing with the temperature and rapidity of the current of CO, and dependent upon the molecular condition of the oxide. At 400° C to 450° C, iron oxide is reduced with very great rapidity, which *increases but moderately with further rise of temperature.* At 400°–500° C, carbon deposition is most rapid; *above this point it decreases rapidly,* and ceases at a full red heat.

2. Carbon* reduces CO_2 by the reaction

$$(1)\ C + CO_2 = 2CO,$$

at all temperatures above 500° C, at a rate increasing with the temperature and rapidity of the current of CO_2, and dependent upon the molecular condition of the carbon. (Very soft forms of carbon attack CO_2 at temperatures slightly below 500°C.) *This action takes place slowly below* 650°C, but *above this temperature the intensity and rapidity of the action increase very fast.*

3. CO and CO_2 interfere with each other's action. *But the higher the temperature at which a given mixture of CO and CO_2 is exposed to carbon and iron oxide, the more powerful is the tendency to reduce CO_2 by reaction* (1) compared with the tendency to produce it by reactions (2), (3) and (4.)

From this it will be seen that there is a broad margin of temperature between the point where CO_2 is generated by reduction of iron oxide and carbon deposition and that where the CO thus formed can be reduced by carbon; and that, if our iron oxide is entirely reduced at temperatures between 200°C and 500°C, all the CO_2 thus formed will be saved, (the overlying fuel through which it escapes being, of course, in such case below 500°C), our fuel will produce its full calorific and reducing effects, and we shall have reached the maximum economy in this respect. [This can never be fully realized in practice, for the joint action of CO and C seems powerless to remove the last traces of O below the temperature of fusion.]

Moreover, the more of the iron oxide is reduced below 500°C, the nearer we shall approach to this limit, and the less CO_2 will be reduced. Again, it follows that if iron oxide is to be reduced above 500°C, the lower the temperature at which it is reduced the less of the CO_2 thereby generated will be decomposed—*caeteris paribus.*

Now, the higher our furnace is, the farther its mouth is removed from the tuyeres, and the cooler its upper region is, the longer will the ore be exposed to the reducing action of CO at each degree of heat between 200°C and 500°C, and the more of the CO_2 will be produced at temperatures below 500°C. Moreover, of the CO produced above 500°C, the lower will be the average temperature at which it is produced, the more of the CO_2 so produced will be saved and the less reduced.

The same holds true of the CO_2 formed by carbon deposition. The cooler the upper part of the furnace, the longer will the ore and the ascending CO be exposed to the temperatures (200° C to 500° C) favorable to carbon deposition and too low for the reduction of CO_2, and the more CO_2 will be thus formed and saved.

It sometimes happens that in large furnaces nine-tenths of the reduction of iron oxide take place at temperatures below 500° C. In such a case, at least nine-tenths of the CO_2 formed by reactions (3) and (4) are saved.

If, on the other hand, our furnace is so low and its mouth so near the tuyeres, that the charge is raised to a red heat in the first foot of its descent, nearly all of the CO_2 formed will be exposed to incandescent carbon *in its nascent state,* the reduction of CO_2 will be very highly favored, and very little CO_2 will be formed by reaction (2).

The nearer we get to the first condition the greater will be the calorific and reducing effects of the fuel, and the more of our CO_2 will be preserved. This is not a mere theoretical speculation. The experience of the iron-masters of Europe has shown most conclusively that excessive reduction of CO_2 is lessened by increasing the height and capacity of furnaces, so as to lower the temperature of the gases. If the researches of BELL, TUNNER, and GRUNER, have clearly demonstrated anything, it is this. All that experience has shown us points unmistakably in this direction. "But," Mr. CHURCH will say, "the higher the initial temperature is at the throat, the more rapidly will the CO_2 be formed and the reduction take place, the shorter will be the reducing zone, and the shorter time will the CO_2 be exposed to the fuel, since it will be formed nearer the mouth and have less distance to travel before it escapes from the furnace."

But here temperature is a more important element than time, and more CO_2 will be reduced in one second at 500° C than in a thousand centuries at 200° C. It is far better that CO_2 should travel for a long distance through cool, inert carbon, than that it should be exposed in its nascent state to incandescent carbon, even if it escapes very quickly thereafter from the throat.

Although increasing the temperature of the upper part of the furnace will shorten the exposure of the CO_2 to the fuel, yet it will increase in a greater proportion the rapidity of its decomposition, since the tendency to reduce CO_2 increases more rapidly with the rise of temperature than does the tendency to produce it by reactions (2), (3) and (4).

GRUNER, (p. 6, of GORDON'S translation of "Studies of Blast Furnace Phenomena), raises a somewhat similar point, which is not to be confounded with this. He reasons thus. The reduction of iron oxide and the deposition of carbon together cause an elevation of temperature at the throat. If our furnace is so large that the gases enter the zone of reduction at the temperature to which the actions of reduction and deposition would of themselves raise the materials of the charge, a further increase of capacity would produce no further cooling. The nearer we get to this temperature the slighter will be the effect of increasing the capacity of the furnace, and a size is soon reached beyond which the cooling would be inconsiderable. He then asks, "May not further increments be not only useless, but actually detrimental, by exposing the CO_2 formed in the reducing zone, to the action of the fuel longer, and thus favoring the reduction of CO_2?"

On theoretical grounds I think not. The width of the upper part of the furnace being given, the capacity of the zone of reduction is determined (*caeteris paribus*) by the rapidity with which its temperature increases downwards, which is indicated by the temperature of the escaping gases. The cooler the gases the more slowly is the entering charge heated, the larger is the zone of reduction, and the longer on an average will the CO_2 formed in it have to travel through fuel before escaping, for a given speed of working. I believe that all authorities agree that experience and theory both show that increments of capacity up to the point of minimum heat in the gases hinder the reduction of CO_2. As further increments of capacity will not lower the temperature of the gases, they cannot increase the zone of reduction nor expose the CO_2 formed in it to a longer journey through incandescent carbon: hence I cannot see that, unless the speed of working is lessened, such increments can affect the reduction of CO_2 directly, always supposing that the shape is not distorted. ¶

Such increments of height probably raise the entire zone of reduction bodily, and create below it a region of almost neutral action in the interior of the furnace. Similar useless widenings of the upper part of the furnace, besides affecting the distribution of the descending materials and of the currents of ascending gases often unfavorably, probably widen and shorten the zone of reduction, without altering its size, unless indirectly.

What recorded experience we have, points in the same direction. With the monster furnaces of Cleveland, even after the capacity has been reached beyond which additions produce no further cooling of the gases or economy of fuel, further very great increments show no tendency to favor the reduction of CO_2,* where the section of the furnace has not been made too stumpy.

* Fe and low oxides also reduce CO_2 as C does.

* GRUNER'S instance of the monster Ormesby furnace, which suffers more reduction

I know of no case of a furnace in which more of the CO_2 produced is reduced than in a lower and smaller one, when the conditions of working are the same, and when the gases escape at as high a temperature from the low as from the high furnace.

Whether a furnace can be imagined of height and capacity so much greater than the Cleveland monsters as to favor reduction of CO_2 is an open question, but not, I think, one of direct practical importance. (I believe it has never been definitely settled how many angels can dance on the point of a needle.)

The question need never arise in practice, for it is pretty clearly shown that increasing the capacity beyond, or even up to, that of the Cleveland furnaces is in most cases detrimental from other reasons, and that in no case is any advantage to be gained commensurate with the cost entailed.

But Mr. CHURCH'S position is entirely different from GRUNER'S. GRUNER, after explicitly stating that increments of height and capacity do unquestionably prevent the reduction of CO_2, cautiously says that increments of *capacity*, when carried, as in Cleveland, to *great excess* (sometimes to a capacity of 40,000 cubic feet, with a diameter at the boshes of 30 feet), *may*, under some conditions, favor the reduction of CO_2. But he by no means implies that *height* alone ever can favor it. (See § 23, Studies of Blast Furnace Phenomena.) He most explicitly says that the reduction of CO_2 is favored by a hot top.

Mr. CHURCH, on the other hand, boldly asserts that, in a particular case, increasing the height of the furnace *has* favored reduction of CO_2 or what amounts to the same thing, that diminishing the height and the throat diameter will prevent reduction of CO_2. And as he gives no reason why such diminution should be needed in this case particularly more than in others, nor the dimensions which he considers proper for the height and throat, nor even the dimensions of this furnace which he considers too great, one might infer that all anthracite furnaces are too high and open in the throat, in his opinion, and that the more the height is reduced the less CO_2 will be reduced.

Looking at the matter from another point of view, it is evident that the lower the furnace and the narrower the throat, the less *time* will the reducing gases be in contact with the ore. We must either make up for this loss of time by making these gases more strongly reducing in their nature, by having more CO in proportion to the CO_2 to be formed by the reduction of the ore—*i. e.*, we must burn more C to CO at the tuyeres, which means charge more fuel; or else we must make up for the loss of time by having our gases *hotter*, and the CO_2 they contain more liable to be reduced, which again implies a greater consumption of fuel.

Again, the richer in oxygen the gases escape from the throat, the more oxygen they will have taken from the ore (the blast can only oxidize to CO), the less carbon they need contain, and the less fuel need be charged per ton of product. But it is only at temperatures too low for the reduction of CO_2 by reaction (1) that the gases can acquire a high percentage of oxygen. It then should be our endeavor to reduce our oxide as far as possible at low temperatures, *i. e.*, to run our furnace with a cool top, for if we reduce our oxide at high temperatures, we must dilute the gases with much needless CO, which means to charge much needless fuel.

The whole question hinges on these points; (A) that iron oxide can be rapidly reduced at temperatures far below that at which CO_2 begins to be reduced; (B) that reaction (2) generating CO_2 takes place most readily at such low temperatures; and (C) that the reduction of CO_2 increases with the rise of temperature faster than its formation does. Mr. CHURCH may answer that though these are true of European fuels and ores, their opposites may be true of American anthracite and ores. If possible, it is highly improbable. The Cleveland ore, on the behavior of which most of our information is partly based, is most difficult of reduction, and yields its oxygen at higher temperatures, and more slowly, than nine-tenths of the ores of commerce. But, at any rate, the burden of proof is on him, and in the absence of direct experiments, it seems to me unsafe to assume that which is directly opposed to all recorded experience and experiment for the basis of opinions as to the construction and management of such important and expensive works as anthracite furnaces.

The principal means of economizing fuel I have said to be usually, (1st) enabling the gases to leave the furnace as fully saturated with oxygen as possible, (2nd) to give up their sensible heat as far as possible to the descending materials, (3rd) decreasing the weight of gangue, and of carbonate of lime charged. I have tried to show that building furnaces lower, and with narrower throats, cannot effect saving by the first means. It is hardly necessary to point out why it cannot diminish waste by the second.

The gases acquire their heat mainly at the tuyeres. As they ascend through the descending column of materials they give up their heat to it. The higher the furnace and the broader the throat, the greater quantity of cooling surface will the gases be exposed to, and the cooler will they escape from the throat (*caeteris paribus*). They are indeed subjected to a slight rise of temperature in the reducing zone, but the cooler they enter the zone the cooler they will leave it. I would not be understood to say that it is beneficial under all circumstances to increase the height of furnaces; indeed, there are many cases on record in which, from the peculiar composition or mechanical properties of the fuel, flux, or ore, the lowering of furnaces has produced beneficial results.

Nor do I think that under any circumstances indefinite increase of height could be beneficial. A height is soon reached beyond which additions produce no further economy. The height is moreover limited by the resistance of the materials to crushing, by the increased expense of construction, which is not compensated for by correspondingly increased yield, and by other inconveniences.

The same as to the diameter of the throat. For every height and every set of conditions there is a best width of throat.

I merely say, that if there is an excessive consumption of fuel, not due to the composition and proportions of the flux and ore, it is highly probable, (in absence or ignorance of any preventing peculiarities of the materials), that the consumption can be lessened by increasing the height, (and often with it the throat in proper proportions), until the ascending gases are enabled, (1), to become saturated with oxygen, and (2), to give up, as far as practicable, their sensible heat. Furthermore, that decreasing the height, (and with it the throat diameter), so much as to enable the gases to escape notably hotter, is all but certain to favor the reduction of CO_2.

But Mr. CHURCH says, "Whatever improvement anthracite practice attains, must be made along lines very different from, and often quite the opposite of, those which have led to such marked economy of fuel in furnaces using coke." Very good; but I cannot see that he has given us any reason whatever, (beyond his word that it is so), why these lines should diverge so at the point in question, or that he has pointed out the essential differences of condition between anthracite and coke smelting, which make hot throat *prevent* the reduction of CO_2 in the one case, when we know that it *favors* it in the other. There may be such differences as to produce this specific effect, but if a physician should tell me that a dose of laudanum which would kill other men, would prove to me a valuable stimulant, I should like to know that he had valid reasons for his advice before following it.

than the smaller Consett and Clarence ones, proves nothing whatsoever, as regards the effect of capacity. The reduction of CO_2 is influenced by the rate of working, by the composition and condition of the materials charged, by the *shape* of the furnace, and by other agencies as well as by the capacity of the furnace. GRUNER does not attempt to show that it is due to the latter rather than to any other cause. As an indication that it is not due to the *height* of the furnace, observe that the temperature of the gases is much higher than that of any of the furnaces having more CO_2 in the gases which he cites (p. 55, Gordon's translation). Now I do not think that any one can suppose that increasing the height of furnaces can of itself raise the temperature of the gases. It is fair, then, to conclude that the greater reduction of CO_2, and the higher temperature of the gases are both due to some other source than the great height at Ormesby,

Notes.

Stockton Mine Fire.—The efforts to subdue the fire in the Stockton mines have not been successful. The presence of black damp prevents the men from reaching the fire. There is great danger to life in order to reach the locality of the fire, and great caution must be observed.—*Hazleton Sentinel.*

Tax on Anthracite Coal Mined by Corporations.—Another decision relating to a State tax on coal was filed by Judge PEARSON, of the Dauphin County Court, last week. By an act passed in 1866, a tax of four cents per ton on the anthracite coal mined by incorporated companies was imposed, and several of the large coal mining companies refused, during a portion of 1874, to pay this tax, on the ground that the statute under which it was levied was abrogated by the new constitution of this Commonwealth and also in conflict with the clause of the constitution of the United States which forbids interference with interstate commerce. Judge PEARSON has decided against the mining companies on both points. While he admits that the act of 1868 is in apparent conflict with some of the provisions of the new constitution, he claims that it was legalized by the clause of the schedule belonging to that instrument which says that all laws in force which are not inconsistent with the new constitution shall continue as if it had not been adopted. He also considers that the national constitution is not violated by the tax, because it is not imposed on the commerce in coal, but on the commodity mined before the commerce commences. The case will be carried to the Supreme Court and a decision by that body of the questions it involves, as well as many other questions, will probably be necessary before the exact meaning and scope of some of the clauses of the new constitution will be understood.

Mineral Resources of the Transvaal State.—In the interior of Southern Africa, lying between latitude 21 and 27 South, and longitude 26 and 32 East, there exists a large republic, the Transvaal State, considerably larger than France itself, Dutch in government, but rapidly filling on all sides with an English-speaking population. For some years past, rumors have been afloat that gold existed in the Northern Transvaal, but it was not until the diamond fields began somewhat to wane and men were looking for some new source of treasure further afield that discoveries were actually made. Then it was that a stream began to flow across the Vaal River through the South African Republic to the gold districts beyond the little town of Lydenberg, and lying deep down amid the magnificent scenery in which the Drakensburg Mountains break down on to the flat bushy country which extends eastward to Delagoa Bay. First at Mac Mac and then at Pilgrim's Rest Creek, gold of various quantities was found, from large lumps of 113 oz. to smaller gold and even dust. A white population of some 1000 persons was soon mining in the neighborhood, and many hundreds of natives were helping them in their heavy work of removing the enormous stones and rocks from the bed of the creek, beneath which the largest gold has been found. About the same time as the Lydenberg fields were opened for alluvial working, two rich quartz reefs, one some 200 miles to the northwest of Lydenberg, and the other 300 miles further in the same direction, were discovered, and companies formed to work them by gold-crushing machinery. Both are reported to be doing well and in proof of this more machinery for crushing on a larger scale, day and night, is being brought out from England. To the far North of these gold-fields, and lying towards the Zambesi River, Mr. BAINES, F. R. G. S., the South African traveller, and Herr CARL MAUCH, the discoverer of the vast ruins of Zimbabye, or Zimbao, supposed to be the ancient Ophir, have found three more very extensive systems of reefs, which are only awaiting their development by European enterprise and capital. Amidst the mountains of the Transvaal an abundance of iron and coal also exists; galena and lead are also found in certain districts, and lately a cobalt mine, in which nickel silver has appeared in some quantity.

THE ENGINEERING AND MINING JOURNAL.

NEW YORK, SATURDAY, MAY 1, 1875.

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ROSSITER W. RAYMOND, Ph. D., }

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. RAYMOND will be signed with a star.

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Subscription $4 per annum; $2.25 for six months, in advance.

Advertising Rates. Inside pages 25 cents per line each insertion. Outside pages 40 cents per line. Special reduced rates will be given on application for advertisements extending over a long time or occupying a large space.

THE SCIENTIFIC PUBLISHING COMPANY.
WILLIAM VENTZ, Secretary,
P. O. BOX 4404. 27 Park Place, New York.

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Bon Voyage.

HON. ABRAM S. HEWITT, M.C., sailed on Monday in the *Bothnia*, accompanied by his wife and a part of his family, to spend several months in Europe. Mr. HEWITT's purpose is primarily to seek rest and to repair his health, much broken by the incessant and arduous public and private labor of years. We doubt not, however, that he will find it impossible to forbear visiting iron and steel works, industrial establishments, etc., wherever he goes. To rest completely, he ought to find a spot entirely free from Nature, Business, Science, Art, Literature, Politics—and News. Even if he found such a spot, there is no certainty that he wouldn't at once begin to study it as a curiosity. Some men will not stop, and must be repaired, like a blast furnace, while they are running! We are glad to know that Mr. HEWITT has already measurably recovered from the serious illness of last winter, and that he expects to return in the autumn with renewed vigor, to assume his duties as a Representative in Washington—to say nothing of the innumerable burdens of responsibility, sufficient to crush an ordinary man, which he has been accustomed to carry. Among all the friends and admirers who will greet him on the other side of the Atlantic, none will be more cordial than the numerous foreign members of the American Institute of Mining Engineers, of which he is a Manager, and in the success of which the support of his honored name and his active sympathy has been no inconsiderable element. *

Tests of Iron and Steel.

THE character of the members of the Commission lately appointed by the President to carry out the tests of materials, authorized by Congress, affords a guaranty that the work will be undertaken in a spirit and on a scale of unexampled thoroughness. The admirable article from the New York *Times*, published in another column, was evidently written by a person acquainted with the general subject, and well-posted also on the plans and feelings of the Commission. We hope the programme it sketches will be faithfully adhered to. The combination of chemical and mechanical tests is an idea for which, we think, ALEXANDER L. HOLLEY deserves the credit; since, though not absolutely original with him, it was so clearly and forcibly urged in his paper on *Tests of Steel*, read before the American Institute of Mining Engineers, as to command universal attention. That paper was translated into many languages, and republished in leading technical journals all over the world. If it did not greatly add to the reputation of its author, the reason lies in the circumstance that his reputation was already so great—as not merely a thorough expert, but also a master, capable of grasping and generalizing the profession, with the details of which he was familiarly acquainted. As a discriminating tribute to the value of chemical analysis, it was all the more important, because Mr. HOLLEY is a mechanical engineer, and not a chemist. We cannot be far wrong in attributing this excellent feature of the Commission's plan to the influence of Mr. HOLLEY. It is pleasant to add that he is a Vice-President of the American Institute of Mining Engineers, and to express the hope that that society, to which he has already contributed so many valuable papers, may learn from him hereafter something of the purposes and progress of the Commission. *

The Fury of the Phœnix, or Reeves' Revenge.

WEBSTER defines the Phœnix as a bird, fabled to exist single, and to rise from its own ashes. This peculiar method of reproduction being highly inconvenient to the parent, it follows that the species is limited to one individual, and the habits of that individual become all the more interesting to naturalists. We feel bound, therefore, for the sake of science, to communicate the discovery we have made, of the manner in which this noble bird deals with editors.

The Phœnix of the present century is an Iron Company represented by Mr. SAMUEL J. REEVES, a gentleman of high respectability, and (when not performing in the *rôle* of Phœnix) great courtesy and good sense. Upon a recent occasion, however, Mr. REEVES, while accoutered as full-fledged Phœnix, with his feathers ruffled, was incautiously approached by some innocent peripatetic agent of the ENGINEERING AND MINING JOURNAL—a scurrilous sheet, in which that illustrious body, the American Iron and Steel Association, has been irreverently alluded to. Now it happens that besides his active work of representing the Phœnix, Mr. REEVES has what might be called the passive duty of appearing as President of the said Association. There is really something Phœnician about this ancient body of Philistines; so the two positions are not so incompatible as might at first sight appear. One Phœnix can easily sit on both nests—there being nothing to hatch.

To the rash agent aforesaid, the wrath of the Phœnix was made known. Mr. REEVES considered the editorial management of this Journal as calculated to damage it—"it" meaning the Journal, *of course;* and, there being no other way of proving the proposition, he furnished the proof on the spot, by withdrawing the advertisement of the Phœnix Company. The trouble with this demonstration was, that the Phœnix Company never had any advertisement in our columns; but Mr. REEVES was quite equal to *that* trifling difficulty. With his eagle eye—no, his Phœnix eye—he saw the point, and neatly covered it thus with his claw: The Phœnix Company "*had been intending*" to put into the ENGINEERING AND MINING JOURNAL a large—oh, a *very* large—advertisement; one that would have occupied a great deal of space, and produced a great deal of revenue—and *this* advertisement would now be promptly withdrawn! After this thunderbolt, of course, our wretched agent feebly gathered up his remains and departed, while Mr. REEVES, not content with the devastation he had wrought, added forcibly that he wished us to favor him by *not* noticing the excellent little manual of "Useful Information for Architects, etc.," which he had recently sent us for notice.

But, Phœnix, it was too late. Our space is hungry for that big advertisement; and you see we are forced to fill it with an editorial. And as for the book, it has gone into the mill whereof our Critical Editor turns the crank, and it will come out, more or less mangled, in due time. You can't stop the machinery of the press, Phœnix, when you once get it started.

Our despair at this moment is two-fold. We didn't know we were going to get an advertisement—that's pang number one. What joyful hours of anticipation we have missed! And then we didn't know we were going to lose it—pang number two. Yet after all, we have lost only the sordid pleasure of being paid. It is still in our power to advertize Mr. REEVES, and we will do it with magnanimous joy. Yes; and if anybody else, though not a Phœnix, should try to control our editors through our business agents, we will advertize him, too, as thoroughly as we know how. If Mr. REEVES isn't satisfied with this notice at the price, we stand ready to give him another.

The *Bulletin* of the American Iron and Steel Association began a good while ago to advise iron masters not to patronize this paper. We have advertized the *Bulletin* pretty thoroughly since and enlarged our paper to accommodate new patrons. Somehow we don't seem to suffer (except in our sensitive soul) by the withdrawal of all those advertisements which we never had; and our Mathematical Editor has a pretty theory about it. He says the subtraction of a negative quantity is a kind of addition! Neat, isn't it?

But to return to our Phœnix. How did we offend Mr. REEVES? Why, by our comments upon Mr. WHARTON's notorious speech. Stop right there, Mr. REEVES, and before you withdraw any more of your advertisements, speak out like a man, and say whether you liked that speech yourself! You planned the BELL dinner at Philadelphia; did you intend to have any arguments about the tariff inflicted on the English gentlemen who were your chief guests? Didn't you do your best to prevent just what Messrs. MORRELL and WHARTON brought to pass? But we will not go further into that point now. Mr. WHARTON, also, probably intends *to intend* to give us an advertisement, and to withdraw it in advance as a lesson to us. So we shall hold in reserve our handsome little notice of him. *

Progress of American Industry as Shown in the Decline of Imports.

IMPORTS FROM GREAT BRITAIN,

For the three months ending March 31st, 1873, 1874, and 1875, respectively, were as follows:

		1873.	1874.	1875.
Copper Unwrought		£179,013	£ 950	.....
" Manufactured		8,567	2,196	£ 363
Hardware and Cutlery		227,906	179,483	166,830
Iron, pig	tons,	28,807	15,190	11,501
" bar, angle, bolt and rod	"	12,709	1,232	726
" railroad, of all sorts	"	69,453	28,025	9,013
" hoop, sheet, and boiler	"	7,651	1,290	464
" cast or wrought, and manufactured	"	4,320	6,520	1,305
Steel, unwrought	"	5,548	3,196	2,469

Tin plates.....boxes,	26,739	27,806	26,744
Lead, pig, rolled, sheet, etc.....tons,	1,362	549	1
Tin, unwrought.....cwt.,	4,959	16,360	9,011

These figures, with the single exception of tin plates, show that our imports are rapidly and steadily decreasing, and in many items they are destined before long to cease. We are even now doing a very considerable export business in several of these articles, and we trust before long we shall, by the adoption of improvements and economy in manufacture, be able to compete "with the most favored nations" in the markets of the world.

The several industries of every great commercial nation pass through three phases: first, that in which the wants of the people have to be supplied by the more developed industry of older countries. In this stage the capital of a new country is limited, and finds more profitable investment in general commerce than in manufacturing enterprise on a large scale. The gradual increase in capital, and the imposition of heavy taxes on the use of foreign goods, by which the profits on manufacturing are greatly increased, tend to develop the manufacturing industries till a time arrives at which the ability to produce equals or exceeds the demand for the manufactured article. The prices of, and profits in, this then decline till, in the natural struggle for existence among manufacturers, only the "fittest survive," having swallowed up the business of the more expensive producers. This necessity leads to the concentration of capital, the adoption of improvements involving large expenditures, and the reduction of cost in manufacturing. This is the present phase of the American iron industry. We have, in most branches of this industry, passed completely through the first phase, and have fully entered on the second. Our productive capacity has attained a development which more than suffices for the demands of the country, and "the struggle for existence" has commenced, and will result, of course, in the "survival of the fittest." The cost of manufacture is being greatly reduced; the exceptional profits of the past will never return, but the development of our industries will continue, and must necessarily be extended, to supply the wants of less favored nations. We are on the eve of the third phase in the development of this industry.

We must seek beyond the limits of our country for a market for our surplus production; in no other manner can we possibly maintain a healthy condition of trade. We are importing but very inconsiderable quantities of iron, and can produce much more than the country can take, if we imported none. Hence, it is quite evident that we must send the surplus elsewhere, or have a stagnant and over-stocked market in which the prices obtained must necessarily be so near the actual cost of production as to leave small profit on the investment.

The secret of success and prosperity in our American iron trade will be found in the more thorough technical education of those employed in it, and the adoption of the improvements which skill and knowledge of the business will suggest. The results of this policy in our steel works enables us to make steel rails to-day as cheap as in any part of the world; and before long, when we can bring the same agencies to bear on the production of the pig iron used in steel manufacture, we will be able to compete in outside markets with European works. If we may use a Hibernianism, we would say that the future of the iron trade is in steel, and in that we are well prepared to hold our own against the world.

The following table gives the gold values of the total imports of iron and steel, wool and woolens, and cotton, silk and linen goods into the United States in each of the last three calendar years:

	1872.	1873.	1874.
Iron and steel.....	$61,724,227	$45,764,670	$24,594,534
Wool and wollens...	81,850,725	62,364,588	44,764,954
Cotton goods.....	36,081,994	32,357,469	27,608,724
Silk goods.....	35,305,090	25,252,423	24,575,583
Linen goods.....	22,777,052	19,480,395	18,163,332
Total.....	$237,739,688	$185,219,545	$139,707,127

The above figures show a falling off in two years of more than *forty per cent.* in the total value of the imports of the articles named, and the course of trade so far this year points to an additional decrease of great magnitude for 1875. The next table gives the total value of the foreign merchandise in the bonded warehouses of the United States, and at the port of New York on the 1st of January in each year:

Date.	All the Ports.	New York.
Jan. 1, 1873.....	$68,205,387	$46,546,873
Jan. 1, 1874.....	62,064,932	39,882,419
Jan. 1, 1875.....	43,792,585	29,312,238

It thus appears that a little more than two-thirds of all the goods in bonded warehouses in the United States are stored at the port of New York.

Table showing the quantities in bond at all the ports on January 1, 1873, and at the same date in 1875:

Articles.	1873.	1875.
Pig Iron, pounds.....	44,800,926	9,462,928
Bar Iron, pounds.....	50,236,274	20,382,495
Iron Rails, pounds.....	93,320,051	49,418,212
Steel Rails, pounds.....	8,594,294	7,286,242
Lead, pounds.....	6,970,305	4,074,819
Printing Paper, Pounds..	891,624	585,484
Salt, pounds.....	85,334,116	108,091,020
Wool, pounds.....	31,760,964	6,178,883
Tin Plates, cwts.....	119,482	52,510

Coal Mining on the Kanawha, West Virginia.

OUR advices from this magnificent coal field are very discouraging. The Gauley Kanawha Coal Company, about which so much has been said, and about which the stockholders know apparently so little, figures largely in this report.

The Gauley Kanawha Coal Company.—The contractor for the branch railroad, Mr. MASON, is prosecuting a suit against the company, but we understand funds have been, or are to be, sent from England to settle his claim. When the mine boss seeks a situation as common miners, at other mines, for his two sons, it would seem that but little is being done. The company is doing nothing with lumber, on which the last report to the company stated, there was an enormous profit; in fact, we think the stockholders of this concern are likely to have a fine opportunity for the exercise of at least one virtue, and will, perhaps, have less confidence in Prof. ANSTED's reports and estimates, by the time they get dividends, than when they invested on their faith in him. The company has, we understand, just purchased a small locomotive for their branch road, a sign that further instalments of "British gold" must be finding their way over here. The grading and ties are ready for the rails. An incline, 1,000 feet long, 600 feet perpendicular, to reach the cannel seam, over the 11-foot seam, has been commenced, and three entries are being started—one of them is in 15 feet. Thickness of cannel said to be from 2 to 2½ feet in a seam of other coal.

Nothing is to be done with the soft coal at present. It was on the mining of this, we believe, the dividends of the company were predicated.

The River Mines, Raymond City, Pioneer, and Campbell's Creek, have been working quite steadily, though at very low prices.

Stewart M. Buck & Co. (late Kanawha and Ohio Coal Company) have been kept pretty busy shipping in both directions. At present the most of their coal goes to Huntington and Cincinnati. They have sent two cargoes to Boston for gas purposes, and have received from the Chelsea Gas Company the following satisfactory report: 4¾ cubic feet to the lb; 17½ candle power.

The *Blackberry mine* has worried through the winter on railroad trade, say 1,000 bushels per day; ⅔ time. *Ashfield's mine*, below Paint Creek, has passed into the hands of the *Kanawha Semi-Cannel Coal Company. Gordon Seal's mine* has done a little under the three different managements and one attachment. On the opposite side of the river, *Hoffman's mine* has been much in the same condition.

Morris & Phillips, who dragged out life through the winter, have sold out to LEWIS & Co., who are now doing quite a large business in supplying the C. & O. R.R. with fuel—pretty risky.

Repplier Bros., (now REPPLIER, FREEDLEY & Co.) have started works directly on the railroad, between *Lewis & Co.*, and the late *Huston Company*. They have their incline and bins in order for the upper vein, and are also working the Huston gas vein. They have only recently commenced work, and are shipping but little coal.

The *Huston Company* is now dead, I suppose, as it has passed through three judicial sales.

This report shows that the Kanawha field is still suffering from the general depression more than most of our coal regions. The lack of transportation facilities, that so long kept back the development of this, the finest of our bituminous fields, has been followed by such a depression in the iron trade as to postpone the investing of capital in iron works on the C. & O. R. R. The cloud under which the field is now struggling cannot surely long continue, for, with natural facilities for the mining of coal and the manufacture of iron, unsurpassed, if equalled, in any other part of the country; with the finest cannel and splint coal in America; with coal which, according to the experiments made at the Quinnemont furnaces, yields a coke superior to Connelsville coke, the future development of the region cannot be doubted, though it has been long delayed.

We hear of a sale of 1,000 acres of coal land, nearly opposite Paint Creek, to a New York company at, it is said, $80,000.

The Lewiston Coal Company has received a certificate of incorporation for mining and shipping coal, and manufacturing and shipping coke. Office at Lewiston, Kanawha County. Twenty thousand dollars subscribed and paid in as capital stock.

CORRESPONDENCE.

Meeting of Chemists.

CINCINNATI, April 6, 1875.

TO THE EDITOR: SIR—Last summer, at the Hartford meeting of the American Association for the Advancement of Science, a new Constitution was adopted, and under its provisions a permanent subsection of "chemistry, chemical physics, chemical technology, mineralogy, and metallurgy" was organized.

Professor S. W. JOHNSON, of Yale College, was elected Chairman of the new subsection for the ensuing year, and the undersigned was deputed to make the necessary efforts to insure a full attendance of chemists and others interested in the application of chemistry.

The meeting for this summer will be held at Detroit, commencing the 11th of August, and continuing about a week. It is very desirable that there should be a full attendance in the new subsection, in order to make it a success. Will you be so kind as to call the attention of your readers to the subject, either by printing this card, or by an editorial notice?

Any one who is interested in chemistry, mineralogy, or in any application of these sciences, will be welcome. Respectfully, F. W. CLARKE.

Influence of Silica, Sulphur, Phosphorus and Manganese on the Qualities of Iron.

By Richard Akerman, of the Stockholm School of Mines.

Continued from Page 287.

White Pig-iron may be very rich in Silica.—From the facts now stated, the conclusion must not be drawn that no white pig can be found with a large percentage of silica, for this, on the contrary, is not seldom the case, the percentage of silica in white coke-pig being commonly very considerable. This, again, depends on the existence in the iron of substances which have an influence more or less opposed to that of silica on the combination of carbon with the iron, inasmuch as they increase the power of the iron to retain carbon in the combined state. Such substances are, as we shall see, sulphur and manganese, and it is, therefore, not to be wondered at that pig iron, with a comparatively considerable percentage of either of these substances, may be white, though its content of silica at the same time is large. Thus, in white coke-pig rich in silica, there is, in most cases, a considerable quantity of sulphur to be found, the percentage of carbon being at the same time comparatively low; and that spiegeleisen, notwithstanding a large content of combined carbon, may be somewhat rich in silica, depends on its having at the same time a large content of manganese.

The Form in which Silica occurs in Iron.

In the same way that carbon occurs in iron both in combination and as graphite, so, perhaps, silica may also exist in iron, both in a combined state and as only mechanically incorporated; but, inasmuch as the iron has a much greater power to dissolve or combine with silica than carbon, it is only quite exceptionally that any separate free silica is found in iron, while on the other hand, as is generally known, pig-iron containing graphite is exceedingly common.

That silica is commonly combined with the iron, and not mechanically incorporated with it, becomes very evident from some experiments made by Snelus (1) on varieties of English pig-iron rich in silica. As the specific gravity of silica is only 2·49, while that of pig-iron is in general over 7, it was intended in these experiments to separate by washing, according to their specific gravity, the lighter from the heavier borings obtained from the varieties of pig-iron in question, and then see if the former were richer in silica than the latter, which ought to have been the case if the silica was found in the iron free or only mechanically incorporated. Further, as the free silica possibly occurring in pig-iron ought to be more brittle than the pig-iron itself, and therefore, after the boring, would be in a finer state of division than the iron, another portion of borings was divided by sifting, according to size, into two varieties, whose content of silica was afterward's ascertained. The finer and lighter portions thus separated were, in comparison with the others, quite inconsiderable, and the results obtained by both these methods of procedure appear from the following analyses:—

The unseparated borings.		The specifically heaviest and coarsest part of the borings.	The finer part of the boarings that went through the sieve.	The specifically lighter part of the borings.	The specifically lightest part of the borings.
Grey Forge Pig from Middlesborough.					
Carbon {Graphite,	2·65	3·000	1·834	7·315	37·623	41·044
Carbon {Combined,	·35 }					
Silica		1·885	1·885	1·610	1·240	1·211
Sulphur		·070	·060	·189	·760	·644
Phosphorus		1·780	1·773	1·770	1·345	1·344
Manganese		·497	·490	·482	1·383	·875
Iron		—	94·200	—	57·735	54·733
Grey Bessemer Pig from Dowlais.						
Carbon {Graphite,	2·99	3·190	2·072	7·790	10·111	21·274
Carbon {Combined,	·20 }					
Silica		3·849	3·880	3·639	3·443	3·158
Sulphur		·011	·011	·036	·054	·066
Phosphorus		·076	·079	·070	·070	·058
Manganese		·244	·240	·230	·216	·164
Iron		—	93·708	—	86·101	75·278

The incomparably largest part of the carbon of these varieties of pig-iron consisted, as appears from the analyses, of graphite, wherefore it is also natural that the percentage of carbon should be much greater in the finer and lighter portion of borings than in the rougher and specifically heavier. But the analyses, on the other hand, show that a completely opposite relation subsisted with respect to the silica, or that the amount contained was greater in the rougher and heavier than in the finer and lighter portions of the borings, from which the conclusions may be drawn that the silica in the varieties of pig-iron in question does not occur in a state of mechanical mixture, but of combination with the iron.

In the same way it is proper to consider the silica found in the pig-iron as in general combined with the iron or dissolved in it, for otherwise it could scarcely replace combined carbon in the pig-iron, which, however, we have seen to be the case; but it is not therefore affirmed that some silica may not also occur exceptionally in the iron in a state of mechanical diffusion. That this, on the contrary, sometimes happens, R. Richter (2), among others, believed that he had discovered when he thought that he had found small crystals of silica in a pig-iron from Gradaz, in Krain.

Silica in a state of Separation in or upon Pig Iron.—Less uncommon than to find free silica in a state of separation in pig-iron is it to find, in blisters or cracks occurring in it, silicic acid, white and more or less shining, formed during, or immediately after, the cooling of the pig-iron through the oxidation of silica hitherto combined with the iron. Karsten (3) describes such separation of silicic acid half an inch thick with shining fracture, combining white color and silky lustre. In the collections of the Stockholm School of Mines there is also to be found a specimen of bright silicic acid of the same kind, which after a blowing out of Trehörning's furnace was found in its walls, having undoubtedly been formed by the oxidation of the silica in the pig-iron. Finally it happens also that silicic acid separates itself on the surface of the iron and covers it with a white powder, in consequence of which such iron is called "hvitsotsjern" (white soot iron). The cause of the occurrence of such iron has been stated by L. Rinman (4) who found that such a surface-covering was only formed when the pig-iron was run into damp moulds; but, on the other hand, was never seen when the moulds were quite dry, whence it follows that the oxidation of silica in this case is caused by watery vapor.

The Influence of Silica on the Qualities of Iron.

The influence which silica exercises on the qualities of iron has many different aspects, and this question appears to have been cleared up to some extent first through Mrázek's recent researches (5). According to him, the influence of silica is in many respects analogous to that of carbon, but in general much weaker. Thus silica increases the hardness of iron, but in a less degree than carbon does. The silicious iron formerly mentioned, with 7·42 per cent. silicium, has, for example, no greater hardness than No. 5·5 of the scale of hardness, or between apatite and felspar. A considerable difference between the influence of silica and carbon in this respect is, besides, that the hardness of silicious iron is only inconsiderably increased by heating followed by hasty cooling or hardening.

Silica also exercises a similar, but, according to Mrázek, a much weaker influence than carbon on the fusibility of iron, inasmuch as a pure silicious iron, with 7·42 per cent. silica, as has already been stated, showed itself less fusible than pig-iron rich in graphite, pure carbon-iron, but was also more easily fusible than steel of middling hardness. The old view that silica increases the fusibility of iron in a specially high degree is perhaps, so far incorrect; but yet it appears probable, from Mrázek's researches, that the influence of silica upon the fusibility of iron is greater than when it contains carbon in addition.

With respect to the strength and malleability of silicious iron, both Mrázek and Hahn describe the pure silicious iron produced by them as exceedingly brittle. The silicious iron, with 7·42 per cent. silica, which has been frequently referred to, could be drawn out at a red heat, but great care was necessary, and in particular the first stroke of the hammer required to be very gentle if the iron in question, at a red heat, was not to fall asunder under the hammer. At a white heat, on the contrary, it showed itself not at all impatient of the hammer, but then withstood the strongest blow, and could be welded without the least difficulty. After drawing, the silicious iron was also brittle or cold short, but not in so high a degree as before.

When the iron, besides silica, also contains carbon, the effect of silica is according to Mrázek, so much the worse, inasmuch as it also diminishes the strength of the iron when strongly heated, but he thinks that the hurtful influence of silica in this respect is weaker than that of an equal quantity of carbon.

Karsten (6) was of opinion that the effect of silica on the strength of iron is even so great that malleable iron and steel with more than 0·05 per cent. silica cannot be quite good; and malleable iron with 0·37 per cent. silica would, according to him, be in a high degree "faulbrüchig" by which term the Germans understand the quality, that iron when worked in a heated state shows defective coherence or little cohesiveness, and besides, when cold, shows no particular strength. That Karsten over-estimated the hurtful influence of silica on iron, especially when it is in a heated state, is evident from the fact that two dissimilar varieties of Krupp's celebrated cast steel were found, when examined at the Stockholm School of Mines, to contain 0·3 per cent. silica, and that Boussingault found in Krupp's cast steel 0·44 per cent. silica (7). Further, E. Brusewitz, who examined several varieties of Bessemer steel rich in silica, found in one of them, which was indeed quite too brittle for hammers, but serviceable for knives and scissors, 0·497 per cent. silica (8).

That the influence of silica is not so particularly great is seen very clearly from the researches of Mrázek, for he has found an iron free from manganese, which, when heated, was of excellent quality, and even when cold and unhardened showed that it possessed considerable toughness, 0·543 per cent. silica, and 0·258 carbon; and when the iron, like that examined by Brusewitz, contains a considerable quantity of manganese, it may also, according to Mrázek, contain even more than 1 per cent. silica, without showing itself difficult to work when heated.

Berzelius speaks of an iron which, though it contained 8.87 per cent. silica, was very ductile, and could, even in an unheated state, be beaten out to thin plate (9); but this is yet in the highest degree extraordinary, for Mrázek, as has been stated, has found that silica has a very strong tendency to make iron cold short; and Snelus even goes so far as to maintain that Bessemer steel, with 1 per cent. and upwards of silica, is hard and brittle, and that the brittleness of pig-iron is so essentially increased with its content of silica, that experience has taught him to estimate the quantity of silica in English Bessemer pig, by the greater or lesser ease with which it can be broken (10).

(1) "The Journal of the Iron and Steel Institute, 1871." Vol. 1., p. 28.
(2) "Berg-und Hüttenmännisches Jahrbuch der k. k. Bergakademien," Bd. XL., p. 289.
(3) Eisenhüttenkunde. 3te Ausg., Th. 1, p. 481.
(4) Jernkontoret's Annaler, 1860, p. 138.
(5) "Berg-und Hüttenmännisches Jahrbuch der k. k. Bergakademien," Bd. XX., p. 406.
(6) Eisenhüttenkunde, 3te Ausg., Th. 1, p. 479.
(7) Dingler's Journal. Bd. 103, p. 215.
(8) Jernkontoret's Annaler, 1871, p. 234.
(9) "Lehrbuch der Chemie," 5te Aufl. Bd II., p. 745.
(10) "The Journal of the Iron and Steel Institute," 1871. I, p. 34.Vol.

A chief reason for the differing accounts of the influence of silica on the qualities of iron is, without doubt, to be sought for in the difficulty of obtaining iron with varying contents of silica, but, in other respects, of exactly similar composition; and it is, among other things, just in this repect, that MRÁZEK's often-named researches mark themselves out as superior to any others hitherto undertaken. Especially has the formation of a just estimate of the influence of silica often been rendered difficult through varying contents of silica being attended by varying contents of manganese; but it is thought, in the meantime, to follow from MRÁZEK's experiments, as has already been stated, and will further on be seen in greater detail, that the influence of silica on iron is essentially counteracted by manganese existing at the same time in the iron.

In connection with the differing views of the influence of silica, the circumstance ought, perhaps, also to be pointed out that all iron which, when ready to be refined, has not been quite fluid, contains slag, and that the silica found when puddled or hearth-refined iron is dissolved in acid proceeds from the slag always incorporated in such iron, which also has often been the chief cause of some of the defects, which have been ascribed to the silica contained in the iron.

THE REMOVAL OF SILICA FROM IRON.

The silica combined with iron is removed in the same way as the carbon, by oxidising; but while the carbonic oxide, formed by the oxidation of the carbon, escapes in the form of gas, the silicic acid which is formed, on the other hand, not being volatile, remains in contact with the iron. If the temperature is kept sufficiently high, and oxidised iron has either been added at the beginning or formed during the process of refining, the newly-formed silicic acid combines with it, producing a more or less fusible slag.

As silica is more difficult of reduction than iron so, on the other hand, when combined with iron, it is more easily oxidised than the iron itself; wherefore, also, when the temperature is sufficient it can be oxidised not only by free oxygen, but also by oxidised iron. The silica combined with iron can besides be oxidised by carbonic acid, and CARON has even shown that it can be oxidised by carbonic oxide with separation of carbon ($2\,Co + Si = SiO^2 + 2C$). On the last-mentioned fact, without doubt, depends the circumstance, favorable for all refining process, that in general the greater portion of the silica is removed before the iron's content of carbon is materially diminished. So long as the iron's content of silica is yet considerable, the greater part of the carbonic oxide formed during refining is again reduced by silica, which is oxidised in place of it, and the removal of the carbon itself can only begin when the iron's content of silica has, through its oxidation, become comparatively small. Yet exceptionally there has been sometimes obtained, especially with the Bessemer process, an ultimate product poor in carbon but very rich in silica, the cause of which in general, at least to some extent, perhaps has been this, that the amount of carbon in the pig-iron used has been small in comparison with the quantity of silica, which it contained.

THE INFLUENCE OF SILICA ON THE APTITUDE OF IRON FOR REFINING.

The more considerable the content of silica in a pig-iron is, so much the greater must the burning off naturally be when it is refined, as first the silica itself must be got rid of, and, besides, so much iron must be oxidised that the silicic acid produced may form with it "färskslagg," or a silicate so rich in protoxide of iron, that the refining can be carried on with it.

The necessary quantity of protoxide of iron required for the slag varies greatly with the different methods of refining, wherefore also the proportionate burning off for a certain content of silica must be very different with the different refining processes. It is not intended in this paper to enter further into this subject, but there is yet, perhaps, reason to point out, that if no free carbon is present, and the slag and the iron are intimately mixed, and further the temperature is very high, the slag may yet be refining though its content of silica be so large that it may almost be considered as a trisilicate, and in Bessemer slags rich in oxide of manganese, from pig-iron rich in manganese, there has even been found so little protoxide of iron as only 5 to 6 per cent. Although the burning off with the Bessemer process increases also with the pig-iron's content of silica, the loss of iron thereby occasioned is for this reason comparatively very moderate, and this circumstance is of so much greater importance for this refining process because it in general requires, for the obtaining of the high temperature desired for the production of Bessemer steel, at least 1 per cent. silica in the pig-iron intended for it.

With hearth-refining, on the other hand, in which case the iron and slag are in contact with charcoal, the temperature is comparatively low, and the mixture of the iron and slag incomplete, there is commonly required, in order that the slag may be duly refining, so great a content of protoxide and peroxide of iron that their amount rises to 80 or 90 per cent. of the whole mass of slag. Indeed, if the slag used for the Lancashire (Swedish) process is to be kept sufficiently refining without any oxidised iron being separately added, about eighteen times by weight more iron than silica must be oxidised, whence it is easily seen how great an effect the pig-iron's content of silica must have as well on the burning off, as on the time and labor necessary for the refining in question.

The influence of silica on the refining is not confined to what has just been stated; it is thought, besides, that the greater the content of silica is the less is the pig-iron disposed to allow oxygen to act upon it. This is so much the more surprising because the oxidising of the silica precedes that of carbon; but that this, notwithstanding, is the case is shown by the fact that the less silica a pig-iron contains the greater disposition it has, when running out of the furnace, to burn or oxidise with casting out of sparks. The increased difficulty with which oxygen acts on pig-iron in proportion to its content of silica appears most clearly from the observations commonly made with reference to the Bessemer process, that if the depth of the bath and other circumstances are similar the blast forced through the pig-iron is taken up by it the more incompletely the higher the temperature has been at which the iron was smelted, and the greater, consequently, its content of silica.

ERRATUM.—On p. 287, twenty-five lines from the top of the first column, the word *mixed* should have been *mottled*. —*Iron.*

TO BE CONTINUED.

Smelting Operations of the Tecoma Mining and Smelting Company, of Utah and Nevada.

By JAMES P. CARSON, E. M., in the *American Chemist.*

[THE following paper is interesting to mining men on account of the detailed costs given for working expenses, etc. The campaign here referred to is, we think, one made under the supervision of Mr. A. WARTENWEILER, over a year ago.—ED. E. AND M. J.]

The mines of this Company are located in Lucin Mining District, six miles south of Tecoma Station, on the C. P. R. R., and the dividing line between Utah and Nevada passes through the property.

The ores are chiefly ferruginous carbonates of lead.

They are arbitrarily divided into two classes.

The first-class ores are the gray and black carbonates, assaying 45 per cent. to 70 per cent. lead and 10 ounces to 40 ounces silver; and also a fine ochreous ore, assaying 20 per cent lead and 60 ounces to 90 ounces silver; it will vary by measure per ton from 12¼ cubic feet to 17¾ cubic feet. It is self-fluxing, and, when free from molybdate of lead, it is very easily smelted with ordinary care.

The second-class ores are those poor in both silver and lead. They are very calcareous and ferruginous, containing some zinc, and as much as 30 per cent. oxide of iron. They are too basic to smelt alone, but with the addition of silica or two-thirds of first-class ore can be worked with profit. 20 cubic feet weigh one ton.

The smelter was three-quarters of a mile from the mines, and was leased from Buel & Baltimore, at $400 per month rent. It was represented to be in perfect repair, and fully equipped with tools, etc.

The tools consisted of two grindstones, a forge, six slag pots, and a few old shovels and picks.

To repair the furnace, engine, water-pipes, building, etc., and the purchase of the necessary tools, cost over $1,200.

The furnace was of the Piltz pattern, with a movable tap; hexagonal outside, with iron plates at the base, and the usual iron bands around the sides; section at tuyeres 30 × 36 inches; 5 tuyeres with 2½ inch nozzles; tuyeres 10″ above the dam plate; height above tuyeres, 10 feet; section at top, 36″ × 36″—siphon tap.

The blast was supplied by a No. 9 Sturtevant blower, put in motion by a 10-horse portable threshing engine, which also worked a small pump, the waste water from the tuyeres being pumped back into the receiving tank.

The fuel used was Connelsville coke and charcoal. The coke cost at the works $44.08 per ton, but the waste and short weight amounted to 9.3 per cent., which made it cost $48.18.

The charcoal was of the finest description, made from nut, pine, and mountain mahogany and weighed 19 pounds per bushel. It was delivered at the works at 23 cents per bushel, all passing through an inch fork, and all brands were rejected, so that there was no appreciable waste.

It was very much regretted that charcoal could not be exclusively used, but a constant supply could not be depended on; it had to be burned during very severe winter weather, and from contracts let for 30,000 bushels, only 7000 were delivered in time. At the close of work, by great good luck, the only material on hand was 400 bushels of charcoal.

Unlike the ores near Salt Lake, a siliceous flux was needed, but the only available silica in any quantity was obtained near the railroad at $3 per ton. It was in fine sand, and was found to contain nearly as much lime as silica, and in working it increased the loss of metal by carrying off particles in the blast, and frequently rolled to the bottom of the furnace without combining with the charge, so that its use was soon abandoned.

A small quantity of quartz, containing 11 ounces of silver, from one of the adjecent mines, was obtained at $8 per ton. It worked extremely well for our purposes, but on account of the difficulty of mining and transportation, and the owners considering that it was a valuable silver ore, it was delivered only in small lots of 700 pounds or 800 pounds, as a personal favor. It served as a dose for the furnace when in trouble rather than as a flux—close watching, and varying the proportions of the first and second-class ores, had to be relied on for successful working, and of the latter as much was used as the furnace would stand, generally about one-third. The slags were sub-basic, and contained Pb=4 per cent. to 11 per cent. and Ag=0—1·2 ounce. One piece specially selected on account of its iron, with a view of selling it as an iron flux at Salt Lake, contained 18 per cent. silica and 65 per cent. iron.

On account of the economy in the first repairs to the works, the mechanical feed was left, but from the difficulty of controlling the working of the furnace, it was removed and replaced by brickwork at the first opportunity. Two of the

tuyeres were also removed, with a decided advantage to the lining of the furnace and the smelting of the ore.

Report of smelting operations for seventy-five days is as follows :—

In blast, 52 days; repairing, 18 days; delayed for ore, 5 days.

CONSUMED.

First-class ore	595 tons.	Quartz	3·5 tons.
Second-class ore	296 "	Assay first-class ore, lead	42 per cent.
Coke	115·8 "	" " " silver	34 ounces.
Charcoal	9810 bushels.	" second-class ore, lead	25 per cent.
Sand	13·5 tons.	" " " silver	24 ounces.

PRODUCED.

Bullion	278·6 tons	Loss of silver	6·7 per cent.
Assay of bullion, silver	91·52 ounces.	Loss of lead	14 per cent.
Assay of bullion, gold	0·41 ounces.		

17 tons of ore were smelted in twenty-four hours, though on one occasion 23 tons were run through in the same time—one-quarter to one-half second-class ore was mixed with the first according to circumstances.

When quartz could be obtained, the daily charge was as follows :—

Reducing the coke to its equivalent amount of charcoal, assuming 1 ton coke= 200 bushels of charcoal weighing 12 pounds per bushel, then 1 ton coke=126·3 bushels of charcoal weighing 19 pounds per bushel.

Ore		17 tons.
Quartz		0·4 to 0·5=17·5
Fuel consumed, coke = 0·13 T × 17 = 2·21 = 279·12 bus.		
" " charcoal 11 × 17	187 00	
		466·12 bushels.
" " per ton of charge = 26·6 bu. = 505·4 lb.		= 25·27 p. c.
" " " " ore = 27·41 " = 520·8 "		= 26·03 "

The daily cost of labor is as follows :—

3 smelters at $4	$12 00	
3 feeders at $3.75	11 25	
2 helpers at $3.50	7 00	
2 coal and ore wheelers at $3.75	7 50	
		$37 75

To this must be added—

1 foreman at $5	$5 00	
1 smith at $4	4 00	
2 engine drivers at $4	8 00	
2 Chinamen, breaking ore	3 50	
		20 50
Salary of manager		12 00
Total,		$70 25

Cost per ton of ore $4.13.

The cost of repairs is thus represented—

Labor	$762 50
3000 fire bricks at $120	360 00
10 tons fire rock and clay at $30	300 00
Rent, 23 days at $400 per month	316 59
Superintendent, etc., at $12 per day	276 00
	$2015 09

Cost repairs per ton ore = $2 26.

Sundry expenses while running—

1·43 cords of wood for engine at $5	$7 15
Oil, tallow, and waste for engine	39
Lights and lamp-chimneys, etc	1 60
Steel, etc	1 00
	$10 14

17 tons ore smelted per day, cost of sundries, per ton of ore, $0 60.

Cost of smelting one ton ore—

0·13 ton coke at $48.18	$6 26
11 bushels charcoal at 25 cents	2 75
Labor	4 13
Repairs	2 26
Sundries	60
Rent of furnace $13.33 ÷ 17	78
	$16 78

From the above figures, and the uncertain supply of quartz, no attempt was made to smelt the second-class ore alone, but it was successfully introduced into the Salt Lake market, as an "iron ore," and 450 tons were sold at a decided profit.

Metal Deadening, and some Phenomena connected with it.

WHEN a wire, by which a weight is suspended, is made to swing about by torsion, the amplitude of swing, it is known, ever diminishes; the successive amplitudes form, according to GAUSS and WEBER'S observations, a converging geometrical series, and the natural logarithm of the exponent of this series is called the *logarithmic decrement* of the arc of oscillation. We understand by the deadening of the swings, or oscillations, the phenomenon of their ever growing less. The cause of this *deadening* is partly in the resistance which the air opposes to the motion, but partly, also, in the wire itself, the distortion of which also presents resistance to the motion.

This phenomenon of internal deadening *(Dämpfung)* of the metal has formed the subject of a recent investigation by M. HEINRICH STREINTZ, described by him to the Vienna Academy. He studied, in various experiments (which we do not stop to detail), the connection of this deadening with the temperature, with the amplitudes of the torsional swing, with the tension of the wire, with the moment of inertia of the suspended weight, with the diameter and length of the wire, with the annealing of the wire, and with an exceeding of the limit of elasticity. We will here merely give a short statement of his results, and proceed to some practical applications which he makes of them.

The logarithmic decrement, he finds, is independent of the width of swing, also of the tension of the wire; also of the duration of swing, if the change of this is caused by a change in the moment of inertia; finally, it is independent of the length and the diameter of the wire, if the turning moment *(Drehmoment)* changes correspondingly to the change of length. On the other hand, the logarithmic decrement is different for different metals, and also very different for one and the same metal, according as the wire is unannealed or annealed. It is greater in the former case than in the latter. Further, the logarithmic decrement is less the more oscillations the wire has already made, and it approximates, in this decrease, to a certain limit. This phenomenon the author denotes as the *accomodation* of the wires. Lastly, the decrement is much greater with higher temperatures than with lower, so that temperature has been considered as the only cause of deadening.

It will appear from this that the resistance which wires oppose to torsion within the limits of elasticity is less the oftener such torsions are produced, or (as the property is denoted), the wire "accomodates" itself to torsions. The same decrease of resistance is observed where the wire has been annealed. Now, a newly-drawn wire is denser, it is known, than an annealed one; the molecules in the former are nearer each other, and are in a state of reciprocal tension, and so they must present a greater resistance to displacement.

When a newly-drawn wire is heated, the reciprocal tension is still further increased; as we find indicated by the fact that the deadening becomes greater, and, at the same time, in consequence of this tension, an actual pushing assunder of the molecules takes place. If the wire is then allowed slowly to cool, the molecules go together again, but no longer in the way corresponding to their natural state of equilibrium—they do not now go into their earlier condition of tension; and we obtain a wire, consequently, in which the internal friction is less. Now, as through frequent turnings, within the limits of elasticity, the wire becomes softer for such turnings, the same occurs in other changes of form.

It is known that steel pens become softer through use, which involves continual slight changes of form within the limits of elasticity. A similar thing occurs in the seats of iron chairs, formed with tips of wrought iron or steel. They lose their hardness through use, and are ultimately bent.

Accommodation plays an important part in musical instruments. It is a well-known fact that trumpets, before they can be employed in public performances, must first be blown in, or used for a considerable time, in order to develop their full tone-action, and make them capable of being easily blown. In fact, the deadening has first to be lessened for the tone vibrations (or the resistance of the metal to these); and this is effected by putting the metal frequently in vibration. A trumpet may also be blown out of tune. If, when quite new, it comes into the hands of an inexperienced performer, who often blows certains false notes, the trumpet is blown out of tune. That is to say, the deadening decreases for these particular tones, so that the trumpet is more easily thrown into these vibrations, than into others, which are not so often excited; and it becomes, therefore, very difficult for even a practised performer, to avoid these false tones. It would in this case be of no use to diminish the deadening of the trumpet metal by a temporary heating, for this process would affect all the tones similarly; only correct blowing will bring about the desired result.

A similar experience is had with stringed instruments. In these, it is not the strings that require long playing, for their resistance to the vibratory motion is (owing to the smallness of the mass to be moved) unimportant; but the resonance ceases. However excellent the construction of the latter, a long continuance of good playing is indispensible for them. This is accounted for by the fact, that the good player awakens a stronger tone, and so, vibrations of greater amplitude; hence, also, for these, the deadening is diminished. Further, he excites only a certain kind of overtones, which determine the "clang color," and for these overtones the deadening is diminished. Through long rest without use, the advantages of this playing out are again lost, as the accommodation also partly disappears through rest. That pianos do not grow better after long use, is due to the fact that the mechanism of the piano wears out.

The circumstance that, with increasing temperature, the deadening grows so very quickly, may perhaps serve somewhat to explain the process of hardening of steel. The soft steel is heated, and thereby the molecules are brought into a state of greater internal friction. If, now, the hot steel is quickly cooled, the molecules have not time to part with this condition of greater internal friction; it still remains, in part, in the cold state, and we have then a hard steel. The steel, it is known, is harder the quicker the cooling occurs. The resistance of the molecules of hard steel to magnetisation, and the great magnetic residuum, witness also to the greater internal friction of its molecules.

A technical application may be found for the determination of the logarithmic decrement, for, inasmuch as this depends in great measure on the hardness of the metal, its determination may serve in investigating the homogeneity of the hardening.—*Iron.*

Riehlé Bro's Scales.—The Lehigh Valley R. R. Co., have ordered Riehlé Bro's. Patent "Self Adjusting" Track Scales to be erected on the Easton & Amboy R. R. It is said these scales are found to be very superior.

Miner's Strike.—It looks to us as though the miners will eventually be compelled to compromise their differences with the operators—or go in at the reduction. As the question has settled down to one of endurance, there is scarcely a doubt as to how it will result. The men cannot exist without bread, and their scanty store cannot last much longer—a month or two at the most. Capital does not feel the pangs of hunger, and who knows but that the stronger operators are pledged to help the weaker ones in this contest? If such is the condition of affairs, then is indeed the struggle a hopeless one for the miners, and they had better arrange for an amicable adjustment with the least possible delay. Every business interest with us languishes, and those who would assist the struggling men to secure their just demands, find themselves in very straitened circumstances. Had a compromise been suggested and the questions in dispute been settled by "arbitration" as heretofore, the miners of the Middle Coal Fields, might now be enjoying many of the luxuries, of which they have, for so long a time, been deprived.—*Hazleton Sentinel* April 23.

Oil Combination.—The oil trade is agitated by the formation of an extensive combination, which is said to involve already ninety per cent. of the refiners. The friends of the movement declare that its object is only to strengthen the trade, and, by maintaining reasonable rates, to prevent the sharp fluctuations which have proved disastrous. Opponents of the combination denounce objectionable arrangements with railroads which they declare are to be made, and claim that a perilous monopoly is proposed which will crush out the smaller men and companies in the oil business. In the present temper of the public every such trade combination is looked upon with suspicion, however just may be its motive.—*N. Y. Tribune.*

STATISTICS OF COAL PRODUCTION.

This is the only report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending April 24:

	1875.		1874.	
	Week.	Year.*	Week.	Year.
Wyoming Region.				
D. and H. Canal Co	72,290	829,837	58,986	722,624
D. L. and W. RR. Co	78,839	835,887	59,461	723,090
Penn. Coal Co	28,192	338,109	25,494	340,787
L. V. RR. Co	15,279	280,799	20,647	312,130
P. and N. Y. RR. Co	4,021	18,143	3,441	22,650
C. Rit. of N. J	13,924	79,012	34,309	351,298
Penn. Canal	..	..	..	..
Lack. and B. RR	..	41,426	..	50 018
	212,545	2,423,213	202,338	2,522,597
Lehigh Region.				
L. V. RR. Co	5,574	120,988	70,099	881,281
C. RR. of N. J	..	5,358	22,991	246,744
D. H. and W. B. RR	2,078	11,511	..	4,988
	7,652	137,857	93,090	1,133,013
Schuylkill Region				
P. and R. R. RR. Co	26,338	298,290	129,746	1,228,017
Shamokin and Lykens Val.	20,376	256,798	23,586	174,562
	46,714	555,088	153,332	1,402,579
Sullivan Region.				
Sul. and Erie RR. Co	400	4,893	435	7,137
Total	267,311	3,121,051	449,195	5,065,326
Increase	..	..	..	..
Decrease	181,884	1 944,275	..	..

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

Production of Bituminous Coal, 1875.

Tons of 2000 lb.	Previous.	Feb.	Total.
Blossburgh Region	19,039	24,763	43,802
Barclay Region	28,605	26,702	55,307
McIntyre Coal Co	5,911	3,950	9,861
Broad-Top Region	11,107	12,240	23,247
Cumberland Region	87,579	77,184	164,763
East Broad Top	1,799	2,091	3,881
Snow Shoe	6,277	5 624	11,901
Clearfield Region	47,453	59,323	106,776
Alleghany Region	14,887	14,858	29 747
Pittsburgh Region.			
West Penn. RR	16,055	13,758	29,813
Southwest Penn. RR	413	524	937
Gas Coal, Penn. RR	61,893	64,367	126:260
Pittsburgh Coal, Penn. RR	22,172	16,503	38,675
Saw Mill Run RR	287	..	..
Cleveland and Pittsburgh RR	20,882	25,900	46,782
Pittsburgh, Cincinnati and St. Louis RR	50,598	64,820	115,418
Erie and Pittsburgh RR	11,998	15,872	17,870
Pittsburgh, Fort Wayne and Chicago RR	13,718	16,524	30,242
Castle Shannon RR	7,998	8,734	16,732
A. Y. & P. R.R.	242	233	475
Pittsburgh and Connellsville RR	25,850	24,404	50,254
Monongahela Nav. Co	..	..	..
Keeling & Co	8,741	8,750	17,491
Wettengell & Gormley	1,961	..	..
J. W. Carlin & Co	..	..	..
Pittsburgh Va. & C. R.R.	2,346	4,098	6,444
Allegheny Valley R.R.	48,249	44,432	52,681
St. Louis Region.			
St. L. A. & T. H. R. R. and Branches	31,060	30,883	61,943
Illinois and St. Louis	..	..	..
Indiana North and South RR	264	..	..
Evansville & Crawfordsville RR	2,265	2,886	5.151
Ohio & Mississippi RR	20,042	19,654	39,696
Sewanee Region.			
Tenn. Coal & R.R. Co	8,745	9,494	18,239
Kanawha Region.			
Chesapeake and Ohio RR	7,947	6,035	13,982
Warrior Region, Ala.			
South and North Alabama RR	3,424	3,504	6,928
Cahaba Region, Ala.			
South and North Alabama RR	1,390	1,400	2,790
S. R. & D. R.R.	1,257	1,067	2,324
Chicago B. & Q. R.R	37,634	39,661	77,295
B. & M. R.; R.R.	7,371	7,503	14,874
Union Pacific R. R.	12,572	23,025	35,597
Summit County R.R.	..	..	..
Keokuk & Des Moines R. R.	..	..	..
Denver & Rio Grande	3,104	2,939	6,043
Cairo & St. Louis	3,106	..	..
	656,132		

The following table does not give the entire production of our bituminous mines, but it is by far the fullest report published.

The Production of Bituminous Coal for the week ending April 24, was as follows:

Tons of 2000 lb., except where otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2240 lb	58,291	444,426
Barclay Region, Pa.		
Barclay R.R. tons of 2240 lb	3:440	88,450
Broad Top Region, Pa.		
Huntingdon & Broad Top R.R	3,905	59,092
East Broad Top	1,702	11,040
Clearfield, Region, Pa.		
Snow Shoe	1,927	25.119
Tyrone and Clearfield	6,613	250,346
Allegheny Region, Pa.		
Pennsylvania R.R	6,875	61,668
Pittsburgh Region, Pa.		
West Penn. R.R	4,253	60,064
Southwest Penn. R.R	76	1,684
Penn. and Westmoreland gas coal, Pa. RR.	2,362	151,704
Pennsylvania R.R	8,145	85,790
Kanawha Region, W. Va.		
Chesapeake and Ohio R.R	..	..

The Production of Coke for the week ending April 20.

Tons of 2000 lb.

	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	261
Alleghany Region	..	53
West Penn. R.R	652	14,994
Southwest Penn. R.R	13,128	153,541
Gas Coal, Penn. R.R	220	8,447
Pittsburgh Coal. Penn. R.R	2,447	27,131

Receipts at Port Richmond, 1100; shipments, 1500 tons; and balance on hand 800 tons.

The receipts at Buffalo, via. L. S. & M. S. R.R. for the week were 5,247 tons.

The exports of coal from Baltimore for the week were 661 tons, and for the year, 14,004, as compared with 34,811 tons to the corresponding time in 1874.

The decrease of shipments of Cumberland coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads, amounts to 72,736 tons.

Belvidere Delaware RR. report:

	week.	year 1875.	year 1874.
The receipts of coal at Coal Port (Trenton)	..	206	45,025
" " " South Amboy	5,998	17,196	230.592
Shipments at Coal Port (Trenton)	..	196	41,500
" South Amboy	951	95.346	170,436

Wholesale Prices of Anthracite Coal f.o.b., at the Tide Water Shipping Ports per ton of 2240 lb.

The prices of the Lackawanna, Scranton and Pittston Companies, in the following table, are all that have been fixed as yet for the month of May.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
†Lackawanna and Scranton at						
Elizabethport & Hoboken	4 80	4 90	5 00	5 15	5 60	4 60
Pittston at Newburgh	4 70	4 70	4 80	4 90	5 40	4 45
Wilkesbarre at Port Johnston	....	....	....	....	....	....
Plymouth, R. A	....	....	....	....	....	....
Susque. Coal Co. at Amboy W.A.	....	....	....	....	....	....
Kingston at Hoboken	....	....	....	....	....	....
Lehigh Coals.						
Old Company at Port Johnston	....	....	....	....	....	....
Old Company's Room Run "	....	....	....	....	....	....
Sugar Loaf at "	....	....	....	....	....	....
Lehigh Coal Exchange "	....	....	....	....	....	....
Honey Brook at Elizabethport	....	....	....	....	....	....
Spring Mt. C. Co. at Hoboken	....	....	....	....	....	....
Beaver Meadow at South Amboy	....	....	....	....	....	....
Schuylkill Coals.						
Schuylkill white ash	....	....	....	....	....	....
Schuylkill red ash	....	....	....	....	....	....
Shamokin white and red ash	....	....	....	....	....	....
N. Franklin	....	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	....	....	....	....

Pittston coal is delivered to carts in New York or Brooklyn at 65 cents per ton in addition to the above rates.

	Per ton.
Freight from Hoboken and Weehawken to New York	40c.
" " Elizabethport & Port Johnston to New York	45c.
" " South Amboy to New York	50c.

Freight on Lackawanna coal from Roudout to New York, by boats or barges of the D. & H. Canal Co., 50c. per ton.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn, at Greenwich, Philadelphia	$5 20	$6 50
" " at S. Amboy	6 00	6 50
Red Bank Cannel Pa., at Phil	8 00	8 50
" " at S. Amboy	8 50	....
" Orrel, "	6 00	6 50
Youghiogheny, Waverly Co, at Baltimore	5 00	6 50
Despard, West Va., nominal "	4 75	6 50
Murphy Run, W. Va. at Baltimore	4 75	6 30
Fairmount, W. Va " "	4 75	6 50
Newburgh Orrel, Md. " "	4 75	6 50
Cannelton Cannel, W. Va., at Richmond	9 50	11 00
" Splint, " " "	5 00	6 50
Peytona Cannel, " " "	9 50	11 50
Straitsville, " At Sandusky, O "	3 65	11 60

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle, at Newcastle-on-Tyne	10/6@12/9	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	47/	18 00@20 00
" Gas Cannel "	30/	12 00
Scotch Gas Cannel, at Glasgow, nominal	25/	7 50
	Gold.	
Block House, at Cow Bay, N.S.	2 00	5 50
Caledonia, at Port Caledonia	1 75	5 25
Glace Bay, at Glace Bay	1 80	5 50
Lingan, at Lingan Bay	75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion and Vale mines, at Pictou	2 25	5 75

Steam and House Coals.

Broad Top, at the mine, $1,25; at Amboy	4 75@5 00	5 25@5 50
Cumberland, at Georgetown and Alexandria, Va.	4 00@4 25	....@....
Cumberland at Baltimore	4 15@4 50	5 75@6 25
Clearfield, " Derby," " Kittanning," "Sterling," and "Eureka," at the mines, $1.25; at Greenwich, Phil.	4 60	5 65
James River, carbonite, at Richmond, Va	6 75	9 00
" bituminous, " nom.	4 00	6 25

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove. Chestnut.
Pittston coal, in yard	$6 20	$6 40 $5 60
Lackawanna Coal, del'd	6 50	6 75 6 00
Wilkes-Barre, delivered	6 50	6 75 6 00
Lehigh & Locust Mountain, del'd	....	....
Schuylkill Red Ash del'd	....	

The cost of delivering Pittston coal ranges from 40 cents to $1 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$23 00
Liverpool House Cannel " " "	25 00
American Sterling " " "	13 50
American Orrel " " "	....
Red Bank Cannel " " "	14 00
Carbonite " " "	12 00
Cumberland " " "	9 00
Acadia, Pictou, N. S. " " "	14

COAL TRADE REVIEW.

NEW YORK, April 30, 1875

Duties.

Anthracite free. *Bituminous*, per ton of 28 bushels, 80 lb. to the bushel, 75c., gold.

All *slack*, or *culm*, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel, 40c., gold.

Not otherwise provided for, per ton, 40c. gold.

Anthracite.

Although the demand is very active, and we hear of parties paying fancy prices for coal, yet we are unable to learn of many manufacturing establishments that have been compelled to let their fires go out for want of it. Cargoes for immediate delivery, from second and third hands, are being sold at from 40c. to 75c. a ton above circular rates, while for delivery in the early future much better rates can be secured. An order placed upon the books, and awaiting its turn, would be delayed several weeks. By reference to our tables of statistics it will be seen that the production last week was 267,311 tons, or an increase of about 50,000 tons over the previous week. The companies at work say they have been unable to work their mines to full capacity, and expect to add largely to the present output.

The bridge over the Susquehanna at Pittston is so far completed as to permit trains to pass over it, which will permit the D. L. & W. R. R. Co. to increase its business considerably. With this outlook, the approach of warm weather, which will decrease household wants, and active work at the bituminous mines, there is nothing to indicate a coal panic, even though the miners should continue the strike for two months more. The total decrease in the output since January 1st, as compared with the corresponding period of last year, was 1,944,275 tons to the 24th inst. If the strike should continue, say until July 1st, the decrease would be about 3,000,000 tons at this rate. It is usual, during the warm months, to see a large output, owing to the ability of the companies to work their breakers longer hours. Considerable coal is also sold and delivered during these months,

but it is mostly for the wants of the winter, and to take advantage of what are usually the lowest freights of the year.

If the strike should continue until that decrease of the production is reached, consumers would only have delay putting in their coal, which could be fully made up before the close of navigation. A notable portion of the trade belonging to the anthracite companies is being supplied by the bituminous companies, so that it is quite probable that the usual amount of anthracite will not be called for. There is no improvement in the iron business that would indicate any heavy demand from that direction; in general manufacturing there is undoubtedly a revival, but there is no important branch that would be seriously inconvenienced by a short supply of coal—in fact, from a general review of the market and its sources, we are satisfied that no such demand for anthracite is likely to arise in the next two months as to aid, in any appreciable degree, the miners in their demands for the old high wages; and we feel very fully convinced that the course they are following in refusing the wages offered, is one which cannot but be of permanent as well as present injury to the miners themselves. The associated companies have all the strength, and what they never had before, the coherence to maintain their present position for months to come. They make up their losses when work recommences, by selling their coal at higher prices than if they had worked continuously.

Since the mines will be worked to their utmost capacity when the strike is ended, the miners will be able, by steady work and extra exertions, to make up a little of their loss; but not so with the laborers paid by the the day; they can never recover the time now lost, and the wages they receive are already so low that they cannot afford to stand idle—it is their daily bread they sacrifice. The strike will probably result in the complete annihilation of the Miners' and Laborers' Benevolent Association, and will probably strengthen the National Labor Association, which appears to be guided by a wiser and more enlightened policy. It appears strange, indeed, from our independent standpoint, that the controlling spirits of the Miners' Union cannot perceive the irreparable injury they are doing their own cause in prolonging a strike that has for some time past been desperate and totally without hope. Their true interests would assuredly be best served by at once abandoning the unequal fight, and on some more auspicious occasion in the future, they would, under the guidance of the National Association, be able to secure advantages that their present hopeless struggle and consequent exhaustion will deprive them of for years to come. It is not courage to combat the inevitable, nor disgrace to submit to superior strength. Nor is it wisdom or philanthropy to sink in the bonds of poverty and debt a whole class for the sake of showing the ability of a few to stand out still, when every intelligent man must perceive the cause is hopeless. Nothing but suffering and irreparable loss can follow the course adopted, by which two-thirds of the men in the anthracite region are standing idle, while the remaining third is supplying coal at the rate of 15,000,000 tons a year, or nearly three-fourths of all the market would take.

The Lackawanna companies are making the most of the situation, and who knows how far the companies standing idle are participating in their profits?

A cotemporary has fallen, we think, into error in calling the Delaware and Hudson Canal Company to account for compelling those who have boats awaiting at the close of the month to pay the prices current during the month in which the coal is actually delivered, instead of when asked for. Owing to the lateness of the opening of navigation, the destruction of bridges, etc., the company have been delayed in filling their orders; and finding that with the great demand there would likely be an accumulation of boats, that would take the greater portion of their May suplies they very sensibly informed their customers during the early part of this month, that the coal would be Charged at the rates prevailing during the month when delivered. By this means the coal will be more justly distributed, and there will not be so many vessels sent in on peculative account. Sections 8 and 12 of the company's printed "Conditions for the Sale and Shipment of Lackawanna Coal," bear upon the subject. They are as follows:

"8. All deliveries of coal upon monthly allotments, at monthly circular prices, to be charged at the circular price current in the month in which the delivery is made; and in case of a deficiency of delivery, the buyer to have the option of declining such deficiency of delivery in a subsequent month, and under no circumstances whatever shall coal, delivered in one month, be charged at the circular prices of any preceding month, unless the purchaser has a vessel at the shipping ports ready to receive such coal before the expiration of the month in which the delivery was to be made.

"12. In all cases where coal is ordered shipped in company boats, the company will use exertion to fill such orders; but in case they are unable to do so, the amount of such deficiency may be added to the quota of the succeeding month (if the purchaser so elects and notifies the company), and if able to deliver, will be charged at the circular price of the month delivered in."

From the above it will be seen that the company does not agree, in any case, to charge less than the prices current during the month wherein the coal is delivered, although they reserve the right to do so in cases where vessels were entered during the previous month. It was apparent, at the beginning of the year, that the Combination had no programme perfect in detail, but one subject to the requirements of the market, and this is a case in point.

The Strike.—There are no new features in the strike Much discord appears among the miners, but there is no telling when work will be resumed. Both parties appear determined to stand out as long as they can. The companies say they dare not give in, if it takes months to secure their demand for a reduction of wages.

Bituminous.

There is but little to note in the Cumberland, Broad Top, or Clearfield trade. There is a strong demand, and in some cases the companies have all the orders they desire at prevailing prices The production is somewhat behind last year. The strike in the Clearfield region is greatly decreasing that output, while the lateness of the opening of navigation, and the unsettled question of tolls and freights on the Chesapeake and Ohio Canal has delayed business in the Cumberland region, so that at the end of last week the shipments were over 72,000 tons behind the corresponding time last year. We do not learn of any improvement in prices.

Foreign and Gas Coals.—The strike in the gas coal district of Southwestern Pennsylvania continues, with no indications of weakness on the part of the companies or the miners. The cargo of Scotch steam coal, which we noticed last week, is still on the market; but we understand that a buyer's views were approached to within a matter of thirty days' interest. Nothing has been done in Provincial coals in this market, but it is expected that there will be some orders placed in a few days. The harbor af Cow Bay is open.

Freights.—The market is without material change. We refer our readers to our table of rates in another column.

Messrs. Perkins & Job, in their circular bearing date of April 20, report having closed a contract with the Br. Brig *F. H. Odorne* to carry coal from the Provinces to New York at $1 75 per ton. They also note the engagement of tonnage, for the season, for about 15,000 tons of coal from Sydney, C. B., to Montreal, at $2 35. They make the following general remarks: "The depression in the freight market still continues, and rates in nearly all trades are weak. There appears to be but little demand for our products abroad, and sailing vessels find but little remunerative business; this is due to the general paralysis in commercial circles throughout the world."

Baltimore, Md. April 27, 1875.

Reported by our Special Correspondent.

WHOLESALE PRICES PER 2240 lb.

ANTHRACITE.

	By cargoes.	In cars.
Wilkes-Barre, "Lee," or "Diamond,"		
Lump, steamboat	....	$5 60
Broken	....	5 70
Egg	....	6 05
Stove	....	6 25
Pittston and Plymouth.		
Lump and steamboat	....	5 50
Broken	....	5 70
Egg	....	6 05
Stove	....	6 25
"Boston," freeburning white ash	....	5 50
Egg	....	5 70
Stove	....	6 05
Shamokin, (red or white ash)	....	6 25
Egg	....	6 05
Stove	....	6 25
Lykens Valley, red ash, egg and stove	....	6 55

From wharf or yard. wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2,240 lb, $7 25@8 25.

BITUMINOUS.

George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 40	4 50
West Va. Gas Coal f. o. b. at Locust Point	5 50	....

Boston. April 27, 1875.

Reported by our special correspondent.

CARGO PRICES TO TRADE.

Lingan coal	$5 75	Westmoreland, and Penn.	7 25
Caledonia	5 00	Waverly Co. Youghiogh'y	7 25
Pictou	6 15	Cannelton Cannel	11 75
Block House	5 60	Cumberland	6 25@ 6 50
Red Bank Cannel	10 00	Anthracite,	.6 50@ 7 25
Glace Bay	5 00	" Retail	.7 50@ 8 00
Sydney	7 00		

Buffalo, N. Y. April 27, 1875.

Per ton of 2000 lb.

	Slack.	Nut & Slack.	Nut.	Lump
Connelsville coke				5 80
Sterling cannel.				6 00
Red Bank				5 75
Youghiogheny coal for gas				4 75
Briar Hill coal		3 25		4 85
Monterey "		3 25	3 60	3 75
Catfish "		3 25	3 60	3 75
Stoneboro "	2 75		3 75	

Briar Hill coal, and Stirling and Red Bank cannels retail at $7 50; all other coals $1 per ton above wholesale prices.

Anthracite f. o. b. vessel.

Grate	6 70	Stove	7 15
Egg	6 70	Chestnut	6 65

Retail prices delivered and screened, $1 per ton additional.

Chicago, Ill. April 27, 1875.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants.

Retail prices per ton of 2000 lb. delivered to buyer.

		BITUMINOUS.	
Lehigh Lump	$10 75	Briar Hill and Erie	7 50@ ....
Lehigh prepared and car load lots	10 25	Walnut Hill (W. Va.)	6 50@ ....
Lackawanna, Wilkes-Barre and Pittston,*		Midway (West Va.)	6 50@ ....
Grate, egg, and chestnut.	10 00	Cannel	8 00@ 9 00
Stove or range	10 00	Blossburg	8 00
		Indiana Block	6 00
		Hocking " Brooks"	6 00
		Wilmington and Illinois	5 00

*75 cents off these prices for car load lots to country dealers and manufacturers.

Cincinnati, O. April 27, 1875.

No change in prices of coal. Quote same as last week.

Per ton of 2000 lb.

	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	8½c.@9c.	—
Pomeroy coal "	6c.	—
Cannel coal	16c.	—
Semi Cannel	8c.	—
The following are retail prices delivered:		
Youghiogheny — c.		$3 35
Pomeroy — c.		2 80
Cannel — c.		5 60
Kanawha Semi Cannel — c.		3 35
Anthracite		9 50
Foundry coke	8c @10 c.	—
Soft coke	8c @10 c.	—

Cleveland, O. April 27, 1875.

Reported by our Special Correspondent.

Miners are yet out in the Briar Hill (Mahoning Valley) and Massillon region with no prospect of early resumption. The strike occasions but little inconvenience to producers however, there being but little or no demand as yet for coal, occasioned to some extent by the late opening of navigation. Lake freights open at 75 cents per ton, here to Chicago and Milwaukee, free in and out to vessel, and 50 cents per ton to Detroit and Lake Huron Ports. It is expected that navigation will be fully open to all points on chain of Lakes by May 10.

I quote following as rulling prices:

Per ton of 2000 lb. on cars.

Youghiogheny, l'p	$4 40	Columbiana	$3 00
Youghiogheny, nut	3 50	Strip Vein & Steubenville	3 30
Briar Hill, according to quality	$3 65 to 4 00	Mountain Blossburg (blacksmith)	5 40
Massillon	3 25	American Cannel Coal Co.s	
Hocking Valley	3 35	Cannel	4 40
Straitsville	3 35		

Nothing doing in Anthracite.

Detroit, Mich. April 27, 1875.

Specially reported by Messrs. ROBINSON & KEYS, dealers in all kinds of coal.

Prices remain unchanged.

Erie, Pa. April 27, 1875

Reported by our Special Correspondent.

Wholesale, per ton of 2,000 lb.

Bituminous f.o.b.

Briar Hill lump	$4 00	Beaver lump	$4 00

Indianapolis, Ind. April 19, 1875.

Specially reported by Messrs. H. MCCOY & Co.

Prices remain unchanged.

Louisville, Ky. April 27, 1875.

Specially reported by Messrs. BYRNE & SPEED.

Prices remain unchanged.

Milwaukee, Wis. April 26, 1875.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail prices per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 50
Lehigh Prepared	10 50	Blossburg	8 00
Lackawanna	9 50	Pittsburgh	7 50

New Orleans, La. April 24, 1875.

Market firm with some animation for coast and plantation demand.

Pittsburgh coal, retail, per bbl	75c.
" wholesale	35c.
" to steamboats, per box	50c.
" to manufacturers, per bbl	60c.
" shipments per bbl	$6 00
Anthracite, retail, per ton	$12 50
" wholesale per ton	8 50
Spadra (Arkansas) coal, retail. per bbl	75c.
Mt. Carbon, wholesale, per bbl	45c.
" " retail per bbl	65c.
Virginia Cannel, per bbl	90c.
Scotch Cannel, per bbl	1 00

Pittsburgh, Pa. April 27, 1875.

Per ton of 2000 lb. and Bushel of 76 lb.

per ton.		per ton
Youghiogheny coal $2 00	Pittsburgh retail delivered	
" coke..2 00@2 25	per bushel.....90@100	
Connellsville coal..... 2 10	Anth'cite on cars Lehigh $7 75	
" coke..$2 25@2 50	" " Wilkes-	
Pittsburgh coal..... 1 85	Barre..... 6 75	

Twenty-five to fifty cents per ton additional for delivery.

Toledo, Ohio. April 27, 1875.

Specially reported by Messrs. GOSLINE & BARBOUR.
Prices remain unchanged.

Halifax, N. S. April 26, 1875.

Reported by our Special Correspondent.
Prices remain unchanged.

Montreal. April 27, 1875.

Specially reported by Messrs. ROBERT ADAMS & Co.
Prices remain unchanged.

Toronto, Ont. April 26, 1875.

Reported by our Special Correspondent.
Prices remain unchanged.

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton.*	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. via Central Railroad of New Jersey	2 89	2 73	2 86	3 24	3 45
‡ Mauch Chunk, Pa. via Central Railroad of N. J.	16	..	56	51	72
‡ Phillipsburg, N. J.	1 09	93	1 34	1 44	1 65
‡ Elizabethport, Port Johnston, Hoboken and South Amboy, N. J., shipping and wharfage 35c. add.	2 47	2 31	2 80	2 82	3 03
High Bridge, N. J.	2 40	2 20	2 80	2 79	3 09
Somerville and Raritan, N. J.	2 80	2 60	3 20	3 19	3 49
Elizabeth, Cranford, Westfield and Elizabethport, for consumption.	2 95	2 75	3 35	3 34	3 64
¶ Jersey City, N. J., and New York, via Morris Canal	2 85	2 35	3 17	3 24	3 54
Andover, via Delaware, Lack. and and Western RR.	3 30	3 10	3 70	3 69	3 99
§ Trenton, Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

* Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

¶ 20 cents per ton additional for transferring coal from boat to boat, and 30 cents per ton for reshipment of same from wharves.

The following rates of freights and tolls on Schuylkill coals are to take effect from and after March 1, 1875:

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove.	From Tamaqua.	From Port Carbon.	From Mount Carbon.	From Schuylkill Haven.
To * *Port Richmond*, for shipment, via P. & R. R. R., Main Line	1 87	1 82	1 75	1 74	1 67
Philadelphia, Retail yards.	1 97	1 92	1 85	1 84	1 77
Harrisburg, via Lebanon Valley Branch	1 23	1 80	1 73	1 72	1 65
Allentown, via East Pennsylvania Branch	1 52	1 47	1 40	1 39	1 32
Lancaster, and Points on Lancaster Branch, via R. & C. R.R.	1 57	1 52	1 45	1 44	1 37
Dauphin, via Schuylkill and Susquehanna Branch	62	....	1 25 via	1 24 Aub	1 17 urn.
Jonestown, via Lebanon and Tremont Branch	86	....	1 69	1 68	1 61
Lebanon, via Lebanon and Tremont Branch	90	....	1 88	1 87	1 80

* On and after March 1, 1875, a charge of fifteen cents per on will be made for shipping anthracite coal at this point.

From *Tamanend* to *Catawissa*, via Catawissa and Williamsport Branch Railroad..... 94

From *Tamanend* to *Williamsport*, via Catawissa and Williamsport Branch Railroad..... 1 39

Freights on Bituminous Coals from the Mines to Tide-Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles) the charge is 3 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $3 75 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 50 cents per net ton.

From Cumberland to Baltimore, (178 miles) $2 31 per ton of 2240 lb., or $2 02 per net ton, and 4 cents per gross ton for use of cars.

From Cumberland to Georgetown, (152 miles) by canal. Rates undecided, pending settlement of trippages and tolls on boats

From the Mines to Piedmont, (from 4 to 10 miles) 5 cents per ton of 2240 lb per mile on distances less than 5 miles, and 4 cents per ton per mile on distances not over 10 miles.

From Piedmont to Baltimore, (206 miles) $2 69 per ton of 2240 lb., or $2 40 per net ton.

From any point in the Kanawha Valley to the James River wharves below Richmond, (say 350 miles) by C. and O. R. R., including terminal charges, per ton of 2240 lb or Cannel coal, $4 50.

Do., do., for Semi-Cannel or Splint, per ton of 2240 lb., subject to rebate on shipments of 5000 tons or more, $3 65.

From Irwin to W. Phila. (say 332 miles) per P. R. R. Penn. Westmoreland gas coal, per ton of 2000 lb.....$4 75

From Osceola to W. Phila. (say 248 miles) per T. & C. R. R., per ton bituminous coal of 2000 lb..... 3 30

From Fairmount and Clarksburg to Baltimore (say 300 miles) via B. & O. R. R., including loading, per 2000 lb..... 4 75

On through coal after deducting drawback..... ....

From Richmond, Va., to New York, via vessel, 392 miles per 2240 lb.. 1 60

" " " *Boston*, about 650 " " " 2 00

" " " *Philadelphia*, 292 " " " 1 25

From the Mines to Richmond, via James River and Kanawha Canal, 15 miles..... 15

Freights.

Per ton of 2240 lb.

PORTS.	From Baltimore and Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	2 50	....
Albany	....	....
Amesbury, Mass	....	....
Bangor, Me	2 00	....
Bath, Me	1 90	....
Baltimore	....	....
Boston, Mass	1 85	1 75
Bridgeport, Ct	1 60	85
Bristol, Ct	....	1 30
Derby	....	1 10
Dighton	1 65	....
East Cambridge	....	††1 70
Fall River	1 60	1 30
Hackensack	....	....
Hartford	1 80	1 40
Hoboken	1 40	....
Hudson	1 75	....
Jersey City	1 40	....
Middletown	....	....
Mystic	....	....
Newark	....	....
New Bedford	1 65	1 30
Newburyport	1 90	....
New Haven	1 60	85
New London	1 65	1 00
Newport	....	1 30
New York	1 40	§ 40
Norfolk, Va	....	....
Norwalk	2 00	1 60
Norwich	1 65	1 15
Pawtucket	1 85	‡‡1 40
Philadelphia	....	....
Portland	1 85	1 75
Portsmouth, N. H.	2 00	....
Providence	1 60	1 30
Petersburg, Va	....	....
Richmond, Va	....	....
Rockport	....	....
Saco	....	2 10
Sag Harbor	....	1 00
Salem	1 90	1 80
Savannah, Ga	....	....
Stamford	....	85
Stonington	....	1 10
Taunton	....	1 80
Trenton, N. J.	....	....
Troy	....	....
Warren	....	1 30
Washington	....	....
Wareham	1 85	1 30
Wilmington, Del	90	....

§ Under 150 tons, 50c. per ton.
†† 30c. per ton per bridge extra.
‡‡ Towing extra.

THE BRITISH COAL AND IRON TRADES.

April 10, 1875.

North of England.—A good demand continues for gas and house coals, and a fair demand for second and third class steam coals. The latter is caused by the cheapness of these classes of coal, as compared with best steam, buyers taking them in preference. Trade with the Baltic ports will open four or five weeks later this year than usual. It is expected that these ports will be free from ice at the end of this month or the beginning of next. The quotations are as follows: Best households, 13/ 9d.@15/ at the pits; secondary sorts, 9/ 6d.@12/; manufacturing screened, 6/ 9d@7/9d; best coke, at the ovens, 16/@16/6d.; secondary sorts, 14/6d.@15/.

There is a good inquiry for pig iron and a much better feeling in the whole trade. The returns of the Cleveland Ironmasters' Association for March show that there were 157 furnaces built, of which 125 were blowing and 32 out. The make for the month was 174,723 tons, or an increase of 20,523 tons The foreign shipments from Middlesbrough were 19,032 tons, or an increase over the corresponding month of last year of 3,478 tons. Makers' stocks, March 31st, were 96,369 tons, as compared with 92,744 tons, 28th February, showing an increase of 3,625 tons. The accountants have returned £8 14/ 3d. as the average net selling price of manufactured iron for the last quarter, which, with the Staffordshire average of £10 8/ 8¼d. brought the average of the two districts to £9 11/ 5¾d., giving a reduction of 2¼ per cent. in wages. Next month the wages question will again be discussed, and it is believed further reductions will be proposed. Rails are quoted at about £7; ship plates, £8 15/ 9d.; bars, £7 15/@£7 17 /6d.; puddled bars, £5@£5 2/ 6d.; No. pig iron, 63/; No. 3, 58/6d.; No. 4 forge, 56/.

Barrow-in-Furness.—There is a good demand for iron from South Wales and Yorkshire, but from other districts and from local consumers it is very light, buyers only supplying their immediate wants. Stocks, however, are not large, as the makers are restricting the output to the demand. There is no doubt that more iron could be sold if prices were lower, but to reduce them would leave no profit. As the season advances the outlook for a fair business in Bessemer railroad material improves. No. 1 Bessemer pig is quoted, at the works, at 85/ per ton; No. 2, 82/ 6d; No. 3, 80/. No. 1 foundry is quoted at 80/; Nos. 3 and 4, 82/ 6d.

Yorkshire and Derbyshire.—The coal trade in this district is rather quiet, prices declining and in many cases stock accumulating. A fair trade, however, continues with London. Trouble is anticipated from the topmen of many of the pits, while as a rule the miners have submitted to the reduction of 10 per cent. The slackness among the iron works greatly reduces the demand for coal. House coal of the thick seam can be bought at 11/@12/ per ton, which gives but little, if any, profit. At Sheffield there is considerable activity in the heavy iron manufacturing departments. The demand for railroad materials has increased considerably. Crucible steel is also in better request.

Manchester.—There is a good demand for best house coal and good furnace coal, and a tolerable demand for coke. Other descriptions are very quiet and declining in prices. In the Oldham district, it is thought, a reduction of wages amounting to 10 per cent. will have to be made. A meeting was held on the 6th inst. to consider the matter, but was adjourned without taking action. The quotations at the pits are: House coals, 11/@13/ 6d. burgie, 6/ 6d@7/ 6d.; slack, 4/ 6d. @6/; screened gas coal, 13/ 6d.; unscreened, 11/ 6d.; ordinary gas cannel, 29/@30/. Makers of pig iron continue tolerably firm, and at the local furnaces are very fairly off for orders, chiefly in forge iron for the finished iron works in the neighborhood. Foundry qualities are quoted at 72/ 6d., delivered in the district, and forge 67/ 6d. The finished iron trade is very dull, and the rolling mills are generally but moderately employed. Ordinary Lancashire bars are quoted at £8 15/@ £8 17/ 6d. per ton.

Wolverhampton.—Best coal is in steady demand and firm in prices, but common coal and slack are in restricted demand and irregular in prices. The Earl of Dudley's list of prices is as follows: Best thick coal, 18/; seconds, 13/; lumps, 12/; steam, 11/ 6d; bright screenings, 10/; steam screenings, 8/ 6d.; engine slack, 6/, and steam ditto, 5/ per ton. Large heathen coal is quoted at 18/; lumps, 12/, and screenings 10/. The iron trade of South Staffordshire continues in a quiet state, and there is every reason to apprehend a restricted business during the quarter. However, there are arrangements being made for relighting several additional blast furnaces, the total number now blowing being 79. Common cinder pig is quoted at £3@£3 5/; part-mine, £4; all-mine hot air, £5@ £5 5/. The demand for cold blast Shropshire pig is steady at £6 10/. The three ruling quotations of marked bars are £10, £11, and £11 12/ 6d, respectively. Common unmarked bars are offering freely at 8£ 15/ per ton.

South Wales and Monmouthshire.—The strike continues without any new features. There is but little iron being manufactured, and that little at a loss, or but very small profit. The quantity of coal being raised is greater than the demand requires, so that in many cases prices are inclined to weakness. Double screened steam coal is quoted at 19/@20/, f. o. b. Cardiff; colliery screened, 18/@19/; small, 6/ 6d. Hot blast foundry iron is quoted at £4@£4 10/; forge, £3 15/; refined, £4; common bars, £9@£9 10/.

Scotland.—A decline has taken place in the prices of iron, during the past few days. The market, like other commercial marts has been considerably affected by certain disclosures which have been made regarding the affairs of Messrs. Merry and Cunninghame Limited, and those of the Canadian Copper Pyrites and Chemical Company, and the universal dullness of the iron trade has also contributed to the lowering of rates. The price of warrants at Monday's market had fallen under 70/, and business was done the same day, for one month fixed, at 69/ 9d. On Tuesday the market was very flat, with a further decline, there being but a small business at 69/ 3d@69/ 1d. There is thus a decrease of about 3/ from the prices of last week, and the tendency is still downwards. The quantity of pig iron in Connal's stores on Monday afternoon was 29,133 tons. A decrease has also occurred, though not quite to the same extent, in the prices of the principal makers' brands, the quotations of which are as follows: Gartsherrie, No. 1 80/; No. 3, 75/; Coltness, 82/6d.@73/; Summerlee, 80/@72/ 6d.; Langloan, 80/@73/; Govan, 72/@70/; Calder, 80/@72/; Shotts, 80/@73/; Carnbroe, 77/@72/; Monkland, 72/@71/; Clyde, 73/ 6d @71/; Glengarnock, 78/6d.@71/ 6d.; Eglington, 71/@69/; Dalmellington, 70/@69/; Kinneil, 75/@71/; Carron, 75/. The shipments of pig iron from Scotch ports during the week ending the 3rd inst. amounted to 11,180 tons, showing an increase

of 942 as compared with those of the corresponding week of 1874. The imports of Middlesbrough pigs at Grangemouth for the week were 3 070 tons, being 1,075 more than in the corresponding week of last year. As a fall of prices is looked for in the various departments of the manufactured iron trade, as a consequence of the decreased value of pigs, orders are held back for the present, so that the trade is very inactive. In the malleable branch especially great dullness prevails. The coal business is increasing in dullness. Further notices have been given of intended reductions of wages, and the miners in most cases recognize the necessity of the same. A strike has occurred at the collieries of Messrs. Dixon.

Import Duties.

The following are the duties in Gold :

Flat Iron, not less than 1, nor more than 6 inches wide, nor less than ⅜, nor more than 2 inches thick. *Round Iron*, not less than ¾, nor more than 2 inches in diameter, and *Square Iron*, not less than ⅜, nor more than 2 inches square per pound 1 c.

Flat, Round or Square Iron, of larger or smaller sizes than the above mentioned, per lb.....1½c

Provided, that all iron in slabs, blooms, loops, or other forms, less finished than bars, and more advanced than pig iron, except castings, shall pay the same as iron in bars.

Provided, that none of the above iron shall pay less than 35 per cent.

Railroad Bars—Iron.....70c. per 100 lb.

Railroad Bars—Steel.....$1.25 per 100 lb.

Boiler plates, or other plate iron not less than 3-16 of an inch thick, per lb.....1½c.

Scrap castings per ton.....$6 00

" *wrought* " " 8 00

Pig iron per ton.....7 00

Iron ore 20 per cent. *ad valorem*.

Antimony, crude or regulus, 10 per cent.

Copper Ore—On all fine copper contained therein, 3c per lb.

Old Copper, fit for manufacture only, 4c. per lb.

Copper, pigs, bars, ingots or plates, 5c per lb.

" sheets, bolts, nails, spikes, rods, pipes, &c., 45 per cent.

Tin, in bars, blocks or pigs, and grain tin, free.

Tin Plates, or sheet, and terne or taggers tin, 1 1-10c. per lb.

Lead—Bars or pigs, 2c. per lb. Old lead, for manufacture only, 1½c. per lb. Pipes, shot and sheets, 2¾c. per lb.

Zinc, in blocks or pigs, 1¼c. per lb ; in sheets, 2¼c. per lb.; manufactures of, 35 per cent.

Quicksilver, free.

IRON MARKET REVIEW.

New York.

April 30, 1875.

American Pig.—There is not the least improvement in business or in feeling among the trade. The business doing is only in a small way, and at about our quotations ; although the impression is quite general that considerable iron can be bought at a concession. It is said that some of the Lehigh companies are showing a marked disposition to sell. The requirements of consumers are very light, and they have adopted the hand-to-mouth policy, believing that iron will not advance, but that it is inclined to weakness. In asking for quotations, it is quite likely that no great concessions would be offered, but it is more likely that a reasonable cash offer would be promptly accepted. The output of coal is being so much increased that the furnace companies have no fears of being unable to procure enough to supply all their wants, although they are not in all cases able to secure the sizes or qualities they desire, which results in inferior products of iron. We quote No. 1 Foundry at $27@28 ; No. 2, $26 ; and Forge, $22@25.

Scotch Pig.—This market has continued in the same demoralized condition as represented by us last week. The demand for consumers does not increase, while the arrivals are constantly increasing the stocks. Sales of Eglinton are represented to have been made at $29, and Coltness at $32, although it might not be possible to obtain any at those prices now. 100 tons of Eglinton are represented to have been sold at $31.50. We are reported sales aggregating about 700 tons of all kinds, but mostly on private terms. Cable information reports the market in Glasgow as being a little stronger, with but light business. We quote Eglinton at $31.50@$32.50 ; Glengarnock, $33@34 ; Coltness, $34@36. These are the prices at which small lots can be bought, while the prices for larger lots would be a matter of negotiation. Our lower quotations are about the cost of importing.

Rails.—There is a fair inquiry for rails, and some prospects of business. We are reported a sale of 2,000 tons of 50 lb. deliverable in the West, on private terms. We quote American iron at mills at $48@$50 ; steel at $72@$75 ; and English, in bond, at $38, gold. We were shown a letter giving a Western quotation of $50 for iron rails at mill, which can generally be considered an outside figure, although some companies who are well supplied with orders may ask more. In Bessemer rails there are mills that might ask $5 per ton over our higher quotations, but it would be owing to the same cause. The Joliet, Chicago, and Cleveland mills are reported as having orders that will last them the whole year. It is thought the whole stock of foreign rails in the market will be taken by Canada in a very short time, as they are being offered at less than they can be brought from England for, and can be given prompt delivery.

Old Rails.—We are reported a sale of about 250 tons at $27@27 25. The asking price is about $29.

Scrap.—There are no sales reported. Prices appear to be not quite so firm. We quote at $34@35. A sale of Canadian scrap, amounting to about 300 tons, was made at $26 50, gold, delivered here, but owing to a misunderstanding on the question of duties, it was cancelled. If duties had been paid, there would have been no margin in the transaction.

Boston.

April 27, 1875.

Pig is very quiet indeed, and from all accounts just as flat in New York and Philadelphia as here. We have had several parties from these two cities drumming here during the week, not quoting prices but urging foundry men to name bids. So far as learned not a ton has been placed, but the result has been to impress buyers that somebody is about to wilt, and holding out or refusing to make a value may precipitate the market. The most remarkable feature in the trade is the *quoting* temper of some, whom it is utterly impossible to impress that naming high prices does not make a value. However, giving them the benefit of the doubt, the values range from $35 down to $30 on No. 1 X, the latter figure about the level at which the occasional sales are made. The quotations made by the New York parties delivered at Hoboken are $27@$29 No. 1 ; $24@$27 No. 2 ; and $22@26 Gray Forge. We particularly note a popular brand of No. 2 X asking $25, and wanting buyers' views of that quotation.

Bar is selling more freely, with a more uniform adherence to $60 than has been previously noted. Ton lots of specific sizes are selling at $62 50, and this is another indication of a turn for the better. The Pittsburgh mills have all started, most of them turning in on Monday last. Their best prices named to cash Boston buyers is $2 40, with a 30c freight, which is equal to $6 50 per ton landed here. There has been a movement among the manufacturers since the end of the strike to adhere closely to the scale of extras on sizes, which, if done, will force the jobbing markets to advance $3 to $5 per ton. There is a fair call for common sheet iron at 4½c for single and 5c for double. Hardware of all lines is quiet.

"*Steel* is moving along in a quiet way, with prices quite steady. We quote American tool 15@15½c ; American machinery 9½@10c ; do. tires at 6½@70 ; English tool, 16@17c.

Copper is somewhat firmer, with an advance of ⅛c to ¼c quoting at the close. The spot lots moving are very trivial, but the inquiry exists almost wholly in a speculative way, the highest point marked being a sale of 500,000 pounds for May delivery at 23c. The market ranges, however, at 21½@22¾ for spot and the first week in May. We quote New Sheathing 28c ; Bolts and Braziers 30c ; Yellow Metal Bolts 28c.

Lead has had a better tone imparted by the advices from abroad, and closes a fraction higher, quoting foreign 6¼c gold. Domestic 5¾. Sheet and Pipe 9c c'y; Tin-lined Pipe 16½; Bar lead 9c, less usual trade or 10 per cent. discount.

Spelter is in fair request at $7 30 gold for Sicilian, and 6½ currency for domestic.

Tin is dull and easy for pig, and lower for plates. We quote Straits 20 ; Banca 24½ ; Refined English 19¾c gold. Plates are active ; we quote Charcoal I. C., $9 50@10 ; Coke $7 75@8 ; and Terne at $8 50@11 gold.—*Commercial Bulletin.*

Cincinnati.

April 27, 1875.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Our market for pig iron is quiet with a fair demand for foundry and mill iron, and no change in prices. We quote :

CHARCOAL.

Hanging Rock, No. 1, Foundry	$28 00@29 00	4 mos
" No. 2, "	27 00@28 00	4 mos
" Mill	26 00@	4 mos
Tennessee No 1, Foundry	27 00@28 00	4 mos
Tennessee. No. 2 "	26 00@27 00	4 mos
" Mill	26 00@	4 mos
Missouri, No. 1, Foundry	30 00@32 00	4 mos

STONE COAL.

Ohio No. 1, Foundry	27 00@28 00	4 mos
" No. 2, "	26 00@27 00	4 mos
Ohio Mill	25 00@26 00	4 mos
Missouri, No. 1, Foundry	28 00@29 00	4 mos
" No. 2, "	27 00@28 00	4 mos
" Mill	26 00@ —	4 mos

CAR-WHEEL.

Hanging Rock, C. B	45 00@50 00	4 mos
Tennessee "	40 00@45 00	4 mos
Missouri "	40 00@45 00	4 mos
Alabama "	40 00@45 00	4 mos

BLOOMS.

Charcoal	75 00@ 85 00	cash

SCRAP IRON.

Cast	75c.@ 90c.	cash
Wrought	1 25@ 1 50	cash

Chicago.

April 27, 1875.

Specially reported by Messrs. ROGERS & Co., dealers in Scotch and American pig iron.

Quotations are as follows :

No. 1 Coltness	$46 00@ ....
No. 1 Gartsherrie	45 00@ ....
No. 1 Summerlee	44 00@ ....
No. 1 Glengarnock	42 00@ ....
No. 1 Eglinton	40 00@ ....
Warner's "American Scotch"	38 00@ ....
Massilon No. 1 Foundry	35 00@ ....
No. 1 Grand Tower Mo. ores (Bituminous)	31 00@ ....
No. 2, " " "	29 00@ ....
No. 1 Mill	27 00@ ....
Union "A" 1 (Anthracite)	28 00@ ....
Union "B" 1 (Anthracite)	27 00@ ....
No. 1 Lake Superior (charcoal)	32 00@ ....
No. 2 Lake Superior "	30 00@ ....
No. 3 Lake Superior "	33 00@ ....
No. 4 Lake Superior "	35 00@ ....
Bessemer Steel Rails	76 00@ ....
New Iron Rails	52 00@ ....
Old Rails	28 00@ ....

The *Railway Review*, of April 24, says : "The iron trade in the West is fairly active. There are no changes in our quotations this week. The inquiry for rails still continues, and the mill men can complain only of low prices ; they have enough to do. The lighting up of the Pittsburgh furnaces has had no great effect on prices as yet.

"The Joliet Iron and Steel Company's Mills are turning out an exceptionally large product. The product of the converting mill for the week ending last Saturday was 1,286 tons of ingots, thirteen blows being made on Monday. This is the largest product for one week of any mill in the United States on record. The largest rail mill product for one week was made in March, during the week ending the 20th. It was 965 tons of rails for the Grand Trunk Railway of Canada."

The *Northwestern Mining Journal* says : "W. W. Wheaton, General Manager of the Marquette & Pacific Rolling Mill Company, has effected a sale of 5,000 tons of pig iron in Chicago, at $30 per ton. He has also sold 40,000 tons of ore, or as much as the company will be able to mine and ship this season. This is good news, and betokens an improvement in the pig iron and ore market. We happen to know that iron can be made by this company and sold for $30 dollars leaving a very fair profit."

Cleveland.

April 27, 1875.

Specially reported by Messrs. C. E. BINGHAM & Co., dealers in pig iron and iron ore ;

No. 1, Lake Superior Charcoal	33 00@ ....
No. 2, " "	32 00@ ....
No. 3, " "	33 00@ ....
No. 4, " "	34 00@ ....
Nos. 5 and 6 "	35 00@ ....
No. 1, Bituminous foundry	30 00@ ....
No. 2, " "	28 00@ ....
No. 1. " Gray Forge	26 50@ ....
American Scotch, No. 1, Cherry Valley	32 00@ ....
" " No. 2	28 00@ ....
No. 1, Massillon	31 00@ ....
B—1, "	29 00@ ....
No. 2, "	27 00@ ....

The *Manufacturing and Trade Review* of April 27, says : There is but little change to note in the pig metal market. Prices are steady and firm, but there is no advance, nor increase in demand, which seems to be confined altogether to hand and mouth business. Some irregular lots are offered at figures below market rates but the scarcity of funds prevents them from being picked up. Besides, those who need metal prefer to pay a little more for standard lots. Some of the Shenango furnaces for some time idle, have gone in of late, but the Mahoning furnaces which have not been blowing for some time are slower to move, the slow sale of metal and the coal troubles holding them back.

We have nothing new to record in the iron ore market. Advices from above report ice at the "Soo" and between Grand Island and Marquette, and we do not look for a cargo of ore inside of three weeks. Meanwhile there is still more here on the docks than there is a demand for.

Louisville.

April 27, 1875.

Specially reported by Messrs. GEORGE H. HULL & Co.

We have no change to note. The market is quiet and sales comparatively light.

The usual time, 4 months, is allowed on the quotations below.

HOT BLAST—CHARCOAL.

No. 1 foundry, from Hanging Rock Ores	$28 00@29 00
No. 2 " " "	26 00@27 00
No. 1, Mill, from " "	25 00@ ....
No. 1, foundry, from Alabama, Georgia and Tennessee ores	26 00@27 00
No. 2, foundry, from Ala., Geo'a and Tenn. ores	25 00@26 00
No. 1, Mill, from " " " " "	25 00@ ....

HOT BLAST—STONE COAL AND COKE.

No. 1, foundry, from Hanging Rock ores	27 00@28 00
No. 2, " " " " "	25 00@26 00
No. 1, Mill, " " " "	24 00@25 00
No. 1, foundry, from Ala., Geo'a and Tenn. ores	26 00@27 00
No. 2, " " " " "	25 00@26 00
No. 1, Mill, " " " "	24 00@25 00
No. 1 foundry, from Missouri ores	28 00@29 00
No. 2 foundry, from Missouri ores	27 00@28 00
No. 1 Mill, from Missouri ores	27 00@28 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock ores	40 00@50 00
" " Tennessee "	35 00@37 00
" " Alabama and Georgia ores	38 00@40 00
" " Kentucky ores	30 00@42 00

Pittsburgh.

April 27, 1875.

Specially reported by A. H. CHILDS, Esq., Commission Merchant for the sale of pig iron, blooms, ore, etc.

The starting of the mills has thus far been productive of very little effect on the metal market.

Most of the mills have sufficient pig iron on hand for immediate wants, and some are stocked for several weeks.

Holders are generally firm in their prices and anticipate an improved demand.

Quotations are :

No. 1 foundry	$27 00@28 00	4 mos
" 2 "	25 00@26 00	4 mos
Gray forge	24 00@	4 mos
White and mottled	21 50@23 00	4 mos

The *Commercial* of April 24, says:

"The sales of pig metal reported this week are considerably less in quantity than last week's report, and the price about the same.

"This may be accounted for from the fact that nearly all the mills are receiving iron bought in January and February last, which is coming in quite as fast as it can be hauled from the railroad yards, and as the length of time which the mills are expected to run is so uncertain, the proprietors are not willing to buy very large lots for immediate delivery. On the other hand, most of the furnacemen expect higher rates to rule within thirty to sixty days, and therefore are not pressing their metal on the market now.

"Winter weather and snow having continued this year so much longer than usual, has also had some effect upon the market for manufactured iron and nails, but as we may reasonably look for more pleasant weather very soon, it is expected that the market will revive and become much more active than it is at present.

"We are reported the following sales:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

200 tons gray forge	$24 00—4 mos
100 tons white and mottled	22 50—4 mos
100 tons No. 2 foundry	25 00—4 mos
100 tons silvery	23 00—4 mos
100 tons gray forge	24 00—4 mos

CHARCOAL.

100 tons No. 3 mill H. R	27 00—4 mos
20 tons cold blast, Eastern	35 00—cash
15 tons cold blast, Eastern	35 00—cash

BLOOMS.

10 tons Groton	$70 00—4 mos
10 tons Missouri	78 00—4 mos

ANTHRACITE.

50 tons gray forge	$24 00—4 mos."

The *American Manufacturer*, April 28, says: The market continues very quiet, contrary to general expectation, for which there are various reasons, and it may be well to refer to some of the most prominent ones. In the first place, producers generally are making an effort to put up prices, and to this the mills are refusing to respond, and as the most of them were pretty well stocked prior to starting, they are in a position to hold off, and those less fortunate in this respect are buying only as they need it and in small lots. Then, again, manufacturers generally are likely to adhere to the hand-to-mouth policy until there is some better evidence in regard to the future course of the market for the product; if business should promise favorably for the summer, as it is hoped it will, there will of necessity be, sooner or later, an increased demand for the raw article; but if, on the other hand, the outlook does not promise well, they will no doubt adhere closely to the policy of buying only for immediate wants. The producing interest, however, appears to be pretty confident in regard to the future, the best evidence of which is that they are now holding for an advance, and refusing to contract for future delivery at current rates. It is contended by the interest in question that the stock of mill iron in the hands of producers is light, more so than buyers generally are aware of, and this together with very limited production, which is well known and conceded, makes producers very stiff, both as regards the present and future. It is also worthy of notice that the producing interest is in better shape financially now and almost every other way than they have been since the panic and are much better able to contend for an advance than at any time during the past three years. Furthermore, there are some buyers who are apprehensive in regard to the future, as we have intimations that there would be no difficulty in placing considerable iron, either for present or future delivery at $24, 4 mos, but we can hear of no really good mill iron offering under $25, and while brokers report that there are no buyers as yet, at the latter figure; they also report that sellers are but very few, if any, at $24. The demand for foundry continues light and mostly for small lots to supply immediate wants. No. 1 quoted at $27@28, 4 mos, and No. 2 at $25@26; white and mottled $21@22. It is difficult to quote charcoal irons with any degree of correctness.

METALS.

NEW YORK, April 30, 1875.

Gold Coin.—During the week past, gold has ranged from 114⅞ to 115½, and closed to-day at 115¼.

Bullion.—Fine silver bar is quoted at $1 25@1 26; gold, per ounce, and fine gold bar, at par ($20 67, gold, per ounce) to ¼ per cent. premium.

Copper.—The feature of the week under review is the consummation of sales aggregating between 10,000,000 to 11,000,000 lb. of Lake copper, for delivery during the summer months. Of this quantity 5,000,000 lb. are for export, and said to have been sold at about 21c, currency. The balance is said to have been sold to dealers and consumers at a price not given, but supposed to be about 22c. The demand from consumers continues rather light. We are reported sales of about 200,000 lb. Lake on spot, at 22¾c @22¼c, and about 200,000 lb. for early May delivery at 22¼c. If manufacturers are driven to make demands from the present low stocks, before the arrival of new copper, there will probably be an advance of 1c. per lb. Advices from London, bearing date of April 17, says: "Symptoms of unsteadiness have again manifested themselves, resulting in a gradual decline of 30s. per ton in Chili bars since my last; of all the reasons which have been assigned for this rather unlooked-for depression, the most plausible, perhaps, is that the general trade of the country has not revived to the extent which was anticipated; this, however, would not be an argument in favor of the expectation of any considerable reaction taking place just at present. The transactions of the week have been 600 g. o. bs. at £80 to £82 for cash and prompt. In English and Australian a limited business has been observable."

Tin.—There is but little business doing. Straits, in London, on Wednesday, were quoted at £83, which is the latest information we could get. At Singapore the quotation is $22¾ per picul. We quote Straits at 19¾c.; Refined, 19¾c.; L. & F., 19½c.; Banca, 24c. The London *Mining World* of April 17, says: "There is very little business reported in tin. Straits are quoted at from £86 10s. cash; Australian at from £85, to £85 10s.; English ingots £91, to £92. The Dutch market remains dull, Banca having been sold at 51f., and Billiton at 49½f. The 9,000 piculs Billiton, which were sold on Monday last in Batavia, realized an average of 56.10f. per picul, equal to about 49½f. per 50 kilos laid down in Holland, or £86 per ton in London." There is a moderate inquiry for tin plates, and some fair jobbing orders are being placed. We quote charcoal tins at $9 12½@$9 50 gold, ternes $8@$8 50; coke tins $7 25 @$7 75; ternes $7@$7 25.

Lead.—The market for domestics is more firm, and may be quoted $5.87½, with a moderate business doing in a hand to mouth way. Shipments of bullion from the West were delayed about two weeks, but have again resumed. The prospects are for very liberal supplies. A number of smelting works in the Silver districts are reported as about to resume operations.

Spelter and Zinc.—Spelter is fairly active and firm, at 7c. currency for domestic. Up to the time of going to press we were unable to learn the action of the Western Companies at their meeting which was to have been held in Chicago this week. Sheet Zinc is quiet, at 9c. gold.

Antimony is quiet, with lots offering at 12½c. gold.

Quicksilver.—The market for this article remains in the same unsettled condition as reported by us for some time back. The nominal price per lb. in this city is 95c.; San Francisco, 85c.; and in London about £14 per flask. The San Francisco *Commercial Herald*, of April 15, says: "The *Montana*, for Callao, carried 200 flasks, valued at 80c. The *Vasco de Gama*, on her last trip, carried 200 flasks to Mexican ports, and 100 flasks to South America. The market with us is unsettled, and prices more or less nominal. We have no question but that contract purchases for forward delivery could be made at 60@65c.; and a limited quantity for present delivery, at 70@75c. Sales 300 flasks for export to China at 70c.

FINANCIAL.

New York Stocks.

April 30, 1875.

A continued improvement has characterized the operations of the New York Stock Market during the past week. The activity of the Del., Lack. & W. R. R. Stock is the most noteworthy feature of our report; the sales of this stock have aggregated nearly 9,000 shares for the week, at a gradual improvement in price, going from 115¼@123.

The market yesterday opened strong, and continued buoyant to nearly the close, finally closing firm at a slight decline from the highest point. Over 1,400 shares of Consolidated Coal Co. changed hands to-day at from 47⅞ to 49½, finally closing firm at 49. The remarkable activity of this stock is undoubtedly influenced by the lately-increased demand for Cumberland coal, owing to the interruption in our anthracite production.

The transaction in bonds have been very extensive during the week, at decidedly improved figures, the sales amounting to over $200,000.

Quotations are as follows:

	Highest.	Lowest.	Closing.
Pennsylvania Coal Co	—	—	—
Consolidation Coal Co	49½	46	49½
Spring Mt. Coal Co	—	—	69¾
American Coal Co	—	—	—
Maryland Coal Co	—	—	—
Cumberland Coal and Iron Co	—	—	—
N. Y. & Nova Scotia Iron Co	—	—	—
Del., Lack. & West. R.R. Co	123	115¾	122
New Jersey Central R. R. Co	120	112¾	116
Delaware and Hudson Canal Co	121⅜	117¾	120
Quicksilver Mining Co. prefrd	—	—	29½
" " Common	22	19	20
Mariposa Land & Mining Co	—	—	6
St. Louis & Iron Mountain R. R.	—	—	—
Wilkes-Barre Coal Co	—	—	—

Sales for the week, ending April 28th, inclusive, were as follows:

	Shares.		Price.		
Del., Lack. and W. RR	8,963	at from	115¾	to	123
Del. and Hudson Canal	1,604	"	117¾	"	121⅛
New Jersey Central RR	2,803	"	112¾	"	120
Quicksilver Mining Co.	2,213	"	19	"	22
Consolidation Coal Co.	2,160	"	46	"	49½
Mariposa Land & Mining Co.	100	"	6	"	—
" Assessment paid	2,300	"	7¼	"	8
" Preferred	....	"	..	"	..
Maryland Coal Co	....	"	..	"	....
St. Louis & Iron Mountain R. R.	....	"	..	"	....
Spring Mountain Coal Co	100	"	69¾	"	....
Quicksilver Mining Co., prefd.	200	"	29½	"	....
Pennsylvania Coal Co.	....	"	..	"	....
American Coal Co.	....	"	..	"	....
Total Sales	20,443	shares.			
Sales for the week previous	17,880	"			
Increase	2,563	"			

The following are the sales of bonds for the same period:

	Amount.		Price.		
Del., Lack. & W. RR convertible,	$23,000	at from	117⅛	to	120
N. J. Central RR. 1st consolidated mortgage bonds	42,000	"	106	"	106⅛
St. Louis & Iron Mount'n 1st Mtg bonds,	10,000	"	92	"	....
St. Louis & Iron Mountain, 2d Mtg. bonds	17,000	"	55	"	....
N. J. Central Con. Convt.	30,000	"	113	"	118⅛
" " 1st Mtg. N.	....	"	..	"	....
Del. & Hudson Canal, 1st Mtg. Reg. bonds, 1891	....	"	..	"	....
Del. & Hudson Canal, 7s, 1894,	79,000	"	106⅛	"	106¾
Del. Lack. & W. R. R., 2d Mtg.	6,000	"	111	"	....
C. & O. R.R. 1st Mtg. Coupon	....	"	..	"	....
Total Sales	$207,000				

Philadelphia Stocks.

April 30, 1875.

No improvement of any moment has transpired at the Philadelphia Stock Market during the operations of the week; fluctuations of stocks have been confined to very narrow limits at slightly decreased quotations from our last. Prices of bonds manifest a slight improvement with a slight increase of sales.

The following were sold at auction yesterday, at the prices annexed; 32 shares of the Pennsylvania Canal Co. at 10, and 21 shares of the Westmoreland Coal Co., at 87.

Quotations are as follows:

	Lowest.	Highest.	Closing.
Reading R. R. Co.	56	56⅝	56¾
Lehigh Valley R. R. Co.	63	63¼	63¾
Little Schuylkill R. R.	—	—	—
Catawissa R.R.	—	—	—
" " Preferred	43⅝	43¾	43¾
" " New Preferred	—	—	39
Huntingdon and B. T. R.R.	—	—	8
" " " " Preferred.	—	—	15
Minehill R.R.	53¾	54	54
Lehigh Coal and Navigation Canal	50⅞	51¼	51
Morris Canal	—	—	51
" Preferred	—	—	—
Pennsylvania Canal	—	—	—
Schuylkill Navigation Canal	—	—	—
" " Preferred	—	—	15
Susquehanna Canal	—	—	—
Westmoreland Coal Co.	—	—	—
Buck Mountain Coal Co.	—	—	—
Cambria Iron Co.	—	—	17
Locust Mountain Coal Co.	—	—	—
Emaus Iron Co.	—		—
Crane Iron Co.	—		—

The following are the aggregate sales of stocks for the week ending April 28:

	Shares.		Price.		
Reading Railroad	2,173	at from	56	to	56⅝
Lehigh Valley RR. Co.	481	"	63	"	63½
Little Schuylkill RR.	—	"	—	"	—
Catawissa RR.	—	"	—	"	—
" " preferred	590	"	43⅜	"	43¾
" " new preferred	15	"	39	"	—
Huntington & B. T. R. R.	30	"	8	"	—
Huntington and B. T. RR., p'f'd.	200	"	15	"	—
Minehill RR.	169	"	53¾	"	54
Lehigh Coal and Navigation Canal.	9,620	"	50⅞	"	51¼
Schuylkill Navigation Canal	—	"	—	"	—
" " " p'f'd	108	"	15	"	—
Morris Canal,	....	"	—	"	—
Susquehanna Coal Co.	....	"	—	"	—
Cambria Iron Co.	750	"	17	"	—
Pennsylvania Canal	....	"	—	"	—
Susquehanna Canal	....	"	—	"	—
Emaus Iron Co.	....	"	—	"	—
Buck Mountain Coal Co	....	"	—	"	—
Total sales	14,136	shares.			
Sales for the week previous	4,039	"			
Increase	10,097	"			

Sales of the various bonds for the period under review have been as follows:

	Amount.		Price.		
Reading RR. 6s, 43 or 44, or 48—80	..	at	....	to	....
Catawissa RR., new 7s	....	"	—	"	....
H. and B. T. RR., 1st mortgage, 7s	500	"	104¾	"	....
Lehigh convt. gold loan	....	"	..	"	....
Pa. and N. Y. Canal, 7s	....	"	..	"	....
Schuyl. Nav. 6s, '82	6,800	"	80	"	80⅛
L. V. RR. 6s, coup	6,000	"	105	"	....
H. and B. T. 1st Con. bonds	10,000	"	58	"	..
R. C. and I. Co. irregular mort. bonds, Brady Tract	1,000	"	90	"	....
Lehigh Nav. 6s, 1884	3,300	"	102	"	....
Reading RR. debenture bonds	8,500	"	81½	"	82
" " R. G. M. 7s, reg	....	"	..	"	....
" " new convertible 7s	14,900	"	107⅜	"	108
" " 7s, 93	....	"	..	"	....
Reading C. and I. Co. debenture bonds,	....	"	..	"	....
Reading C. and I. Co. mort. bonds, Tamaqua Tract	....	"	..	"	....
Reading C. and I. Co. mort. bonds, St. Clair Tract	....	"	..	"	....

R. C. & I. Co, Wetherill tract	....	"	..	" ....
" " " " Locust Mountain Summit Improvement tract ..	....	"	..	" ....
R. C. & I. Co. Helfenstim tract	....	"	..	" ....
Lehigh Valley RR. 6s, registered	....	"	..	" ....
" " " 7s	....	"	..	" ....
Lehigh Coal & Nav. Co. 6s, gold loan..	11,500	"	102½	" ....
" " " " 6s, 1877	1,000	"	96¾	" ....
Schuylkill Nav. 6s, '95	....	"	..	" ....
" " 7 per cent. boat loan..	....	"	..	" ....
" " 6s, '72	....	"	..	" ....
" " Div'd scrip	....	"	..	" ....
R. C. & I. Co., Glentworth tract	....	"	..	" ....
Chesapeake & Delaware Canal, 6s	....	"	..	" ....
Susquehanna Canal, 6s	....	"	..	" ....
Pennsylvania Canal, 6s	....	"	..	" ....
Shamokin Valley & Pottsville R.R., 7s.	....	"	..	" ....
Allegheny Valley 7 3-10s	2,000	"	95	" ....
" " " Eastern Exte'n.	17,000	"	85	" ....
" " " 7s	....	....	"	.. " ....
Del. Div. Canal, 6s	....	....	"	.. " ....
Total Sales	....	$81,500		

Gold and Silver Stocks.

SAN FRANCISCO, April 28, 1875.

The San Francisco Stock lists continues irregular, with fluctuations generally confined to narrow limits.

The Trustees of the Yellow Jacket Mining Co., have levied an assessment of $5 per share, amounting to $120,000, delinquent May 11th. This is the twentieth assessment levied, aggregating $4,23?,000. The mine has paid twenty-five dividends amounting to $2,184,000. It is nearly four years since the last was paid.

The Raymond and Ely Mining Co., have levied an assessment of $5 per share, delinquent May 10th.

Quotations April 28, 1875.

Gould & Curry	19	Raymond & Ely	52
Savage	132	Eureka G. V.	7
Chollar Potosi	80	Best & Belcher	54
Ophir	104	Kentuck	16
Hale and Norcross	47	Meadow Valley	8
Crown Point	36	Alpha	26
Yellow Jacket	87	Sierra Nevada	13
Belcher	35	Union Consolidated	8
Imperial	9	Mexican	22
Consolidated Virginia	450	Caledonia	20
California	64	Silver Hill	11
Overman	73		

Copper Stocks.

BOSTON, April 29, 1875.

The market for Copper Stocks is slightly irregular, and prices closed firm at our quotations. The following sales were effected during yesterday's operations of the Board:

70 shares of Central at $30 per share. 100 shares of Copper Falls at from $10¾ to $10¾ per share. 75 shares Franklin at $3¾ per share. 100 shares of Pewabic at $7 per share. 300 shares of Petherick at $1½ per share; and 1,000 shares of the Winthrop Mining Co. changed hands at 50c. per share.

Quotations are as follows:

Allouez	17	National	—
Calumet and Hecla Co.*	143	Phœnix	15
Copper Falls	10	Quincy	41
Central	29	Ridge	7¼
Franklin	—	Rockland	1

*Ex-dividend.

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The ENGINEERING AND MINING JOURNAL, which is the Organ of the Institute, and contains its proceedings, transactions and notices of meetings, will be sent to each Member and Associate on the payment of his annual dues. Back numbers cannot, as a rule, be sent.

II. Dues (ten dollars per annum) are payable on election and at the annual (May) meeting. Members and associates elected at the February meeting pay ten dollars only to May of the following year. Remittances should be made, as far as possible, by P. O. Order, payable to the Secretary.

III. Blank proposals for membership can be had on application to the Secretary.

IV. The second volume of Transactions has been mailed to all home members and associates not in arrears. Any member who failed to receive his copy will please notify the Secretary promptly. The Institute is not responsible for the loss of the volume in those cases where members have changed their residences and have omitted to inform the Secretary. Volumes I. and II. will be sent, post-paid, to non-members at five dollars each.

V. Members are earnestly requested to inform the Secretary promptly of any change of address.

VI. The Fifth Annual meeting will be held in Dover, N. J., commencing on Tuesday, May 25th. The Local Committee of Arrangements consists of Messrs. E. S. MOFFATT, E. CANFIELD, and FRED. A. CANFIELD.

THOMAS M. DROWN, Secretary, Lafayette College Easton, Pa.

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TESTING MACHINE WANTED.

The Board appointed by the President of the United States to test Iron, Steel and other Metals will receive proposals, until 12 M., June 1st, 1875, for the construction of a Testing Machine suitable and convenient, in all respects, to subject to either tension or compression specimens of all lengths up to thirty (30) feet, and of any width up to thirty (30) inches and having a maximum capacity of eight hundred thousand (800,000) pounds, and also capable of accurately measuring the strains imposed. The said machine is to be furnished complete with all necessary tools and apparatus, with driving machinery, and holding down bolts ready for erection and operation, and to be delivered at the place of manufacture within five (5) months of the date of contract.

It will be further demanded that said machine shall be taken back in part payment for a machine of two million (2,000,000,) pounds capacity, more or less, at an early date which may be specified in the proposal, and upon terms which shall also be stated in full as in the proposal for the first named machine.

A satisfactory guarantee of efficiency and of completion within the specified time must accompany each proposal and a forfeiture of one hundred dollars ($100) per day, will be exacted in case of non-fulfilment of the conditions of the contract.

The general proportions of the machines are to be based upon a factor of safety of not less than six (6).

Proposals endorsed "Proposals to furnish a Testing Machine," accompanied by complete specifications, and general working drawings showing dimensions of the principal parts must be addressed to the President of the Board,

LT. COL. T. T. S. LAIDLEY, U.S.A.,
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The privilege is reserved of rejecting any, or all, proposals.

By order of the Board,

R. H. THURSTON,
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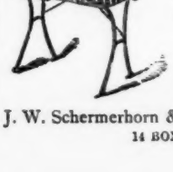

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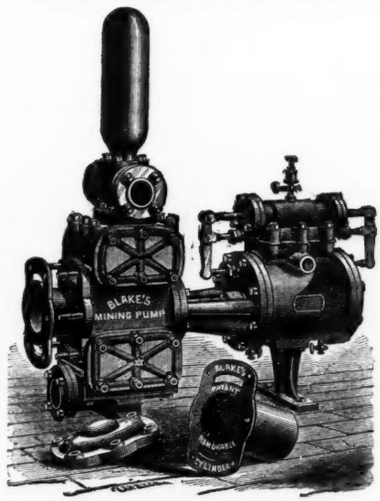

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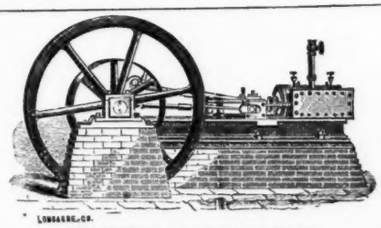

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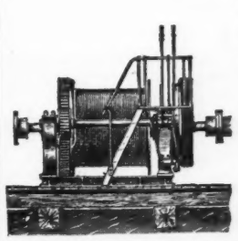

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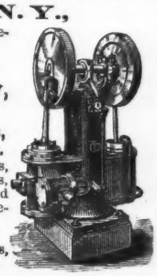

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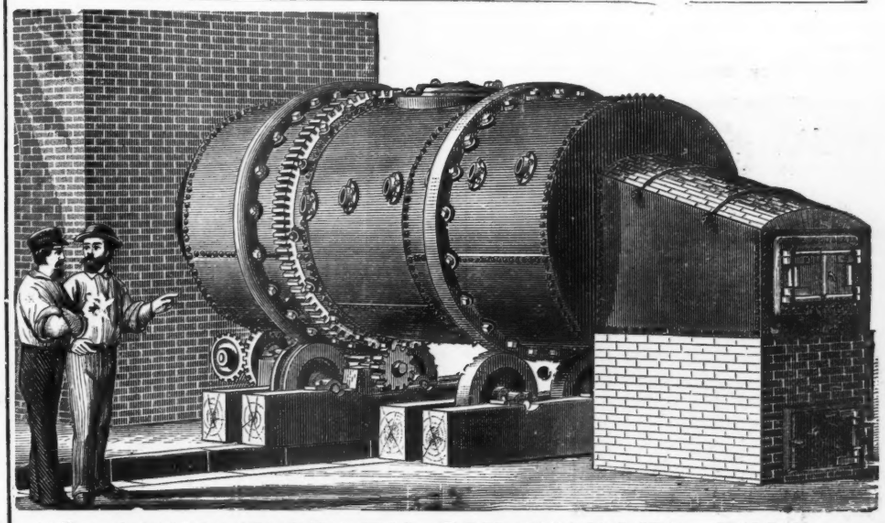

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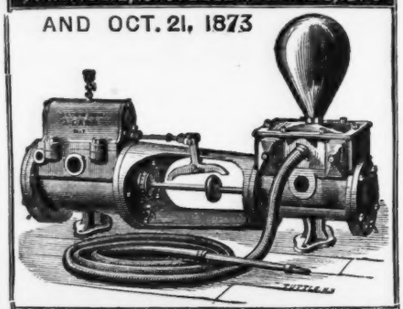

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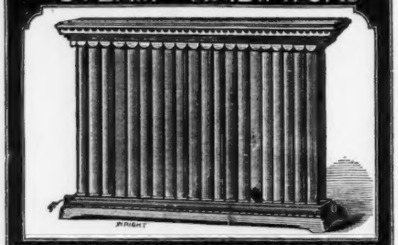

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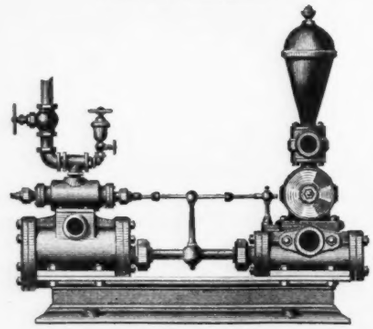

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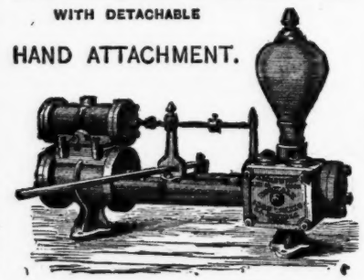

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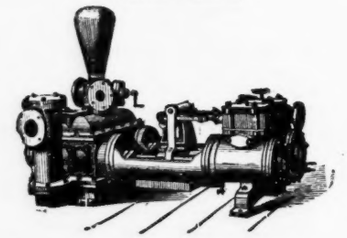

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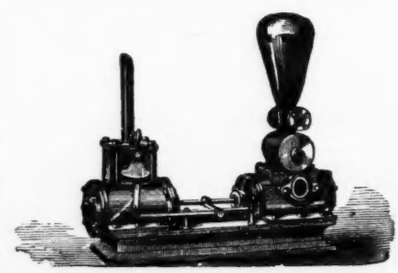

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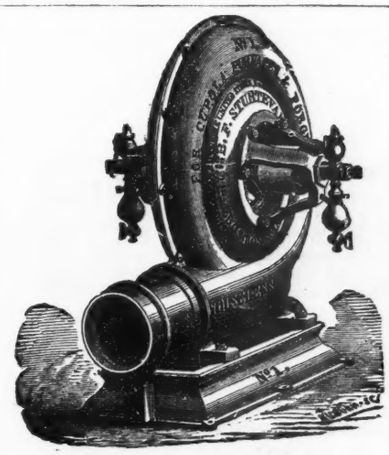

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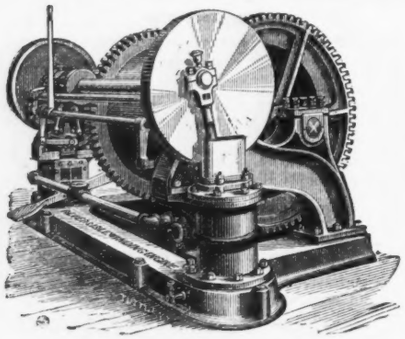

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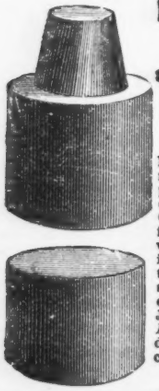

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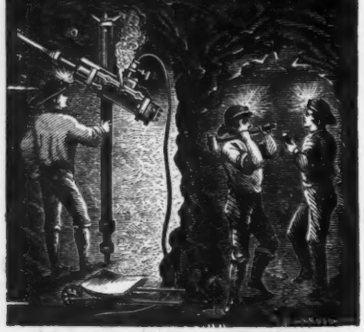

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J. B. WARING, Esq., 133 Centre street, N. Y.

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(Signed.) WALTER TEFFT, Sup't.

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